5.0 DATA USABILITY

This section summarizes the data quality assessment for analytical results reported for soil, water, and soil gas samples collected during this investigation. Only significant data quality issues are summarized. More detailed information and discussions, including verification/validation of the analytical results, are found in the Quality Control Summary Report (QCSR) Field Site Investigation for the 50 Series Complex (FA/BC, 2001). Validation and/or verification of the laboratory analytical data was performed per the criteria specified in the Benicia QAPP (FA/BC, 1999b).

Soil, water, and soil gas samples were collected by FA/BC during September 7 through 28, 1999. Soil and water samples were analyzed by EMAX Laboratories, Inc., Torrance, California. Soil gas samples were analyzed by Air Toxics, Ltd., Folsom, California. Data was received in both hard copy and electronic formats. In general, the data collected in support of this investigation are considered usable for the purpose of engineering decision making.

The following were the most significant data quality issues identified in the data quality assessment. A summary of primary samples and associated QC samples are included in Table 5-1.

- Antimony results for soil samples originally analyzed by EPA Method SW7041 were all rejected due to low matrix spike recoveries. Thirty-seven of the original 86 results were re-analyzed by EPA Method SW6010B with acceptable QC results. However, these results were qualified as estimated values due to a holding time violation. Positive antimony results by EPA Method SW7041, while not quantitative, are indicators of minimum concentrations in the respective soil samples. Only four samples contained positive concentrations of antimony, as measured by EPA Method SW7041, that were not replaced by definitive EPA Method SW6010B results. These are listed as follows:

Field Sample ID	EPA Method SW7041 Concentration (mg/kg)
B055HA001-S01A	1.94
B056BHA003-S02A	376
B057HA003-S01A	602
B057HA003-S02A	610

  A more complete evaluation and comparison of all antimony results is presented in Section 4.0 of the QCSR (FA/BC, 2001).

- VOC (EPA Method SW8260B) analyses for soil samples had 119 results rejected out of a total of 6,889 measurements due to low matrix spike, laboratory control sample, or internal standard recoveries, as well as various calibration issues. Of these 119 rejected results, 114 were associated with compounds that were never identified anywhere at the site and are not considered COIs. The remaining 5 rejected results were associated with 4 compounds: naphthalene, 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene, and TCE.

- VOC (EPA Method SW8260B) analyses for water samples had 33 results rejected out of a total of 1022 measurements due to various calibration issues. All of the rejected results were associated with five compounds (acetone, acrolein, acrylonitrile, methyl ethyl ketone, and vinyl acetate) that were never identified anywhere at the site and are not considered COIs.

- PAH (EPA Method SW8310) analyses for water samples had one rejected result out of a total of 192 measurements. The one acenaphthene result was rejected due to high matrix spike recovery.

- PAH (EPA Method SW8310) analyses for both soil and water samples were qualified as presumptively identified and estimated for all pyrene detections. Results for these samples could not be confirmed for this compound on a second column due to an interfering lab contaminant. The highest pyrene results reported were 1.0 mg/kg and 0.22 µg/L.

- Selenium results in all soil samples were qualified as estimated with a low bias due to low matrix spike recoveries.

Overall, the non-rejected data are of acceptable quality and are suitable for the purposes of this project.

Table 5-1. QC Sample Summary, Benicia Arsenal 50 Series Complex

	Soil			Water[1]			Gas		
Analytical Methods	Number of Primary Samples	Number of Field Duplicate Samples	Number of USACE QA Samples	Number of Primary Samples	Number of Field Duplicate Samples	Number of USACE QA Samples	Number of Primary Samples	Number of Field Duplicate Samples	Number of USACE QA Samples
Metals (6010B/7000)	87	10	6	13[2]		1			
CrVI (7196A)	52	9	4	9		1			
TPH-diesel range/motor oil (8015B)	82	9	5	12		1			
TPH-gasoline range (8015B)	29	4	2	13		1			
VOCs (8260B)	74	9	7	14		2			
PAHs (8310)	71	7	8	12		1			
SVOCs (8270C)	35	4	3	8		1			
pH	61	5	5						
PCBs (8082)	5	1							
Explosives (8330)	7	1	1						
Anions (E300.1)	21	1	1	9		1			
Alkalinity (E310.1)	1			8		1			
TDS (E160.3)				9		1			
TOC (Walkley-Black)	1								
VOCs (TO-14)							12[3]	1	
Total number of samples	526	60	42	107	0	11	12	1	0

1. Water samples consist of 13 *in-situ* Hydropunch™ groundwater samples and 1 grab water sample.
2. Eight groundwater and 1 grab water sample were analyzed for the full suite of metals and 4 additional groundwater samples were analyzed for lead only.
3. Gas samples consist of 8 soil gas samples and 4 ambient air samples.

QA = quality assurance
PAHs = polynuclear aromatic hydrocarbons
PCBs = polychlorinated biphenyl
SVOCs = semivolatile organic compounds
TDS = total dissolved solids
TOC = total organic carbon
TPH = total petroleum hydrocarbons
USACE = United States Army Corps of Engineers
VOCs = volatile organic compounds

6.0 RESULTS AND ANALYSIS

The following sections summarize the laboratory results for the 50 Series Complex site investigation and present an analysis of those results. The geophysical investigation is described first. Then, for both soil and groundwater, the analytical results are presented from an overall site perspective followed by an association of the analytes to former DoD activities. If applicable, a comparison of data from previous investigations is included in this section because of proximity to the 50 Series Complex (i.e., SHM and UST investigations at Buildings 53, 73, 103, and 154).

6.1 Geophysical Surveys

Geophysical surveying was performed to assess the shallow subsurface for potential underground features such as cisterns, USTs and associated piping, to identify subsurface utilities, and to clear invasive investigation locations.

NORCAL performed geophysical investigations at the 50 Series Complex on March 15-16, 1999 and May 24-27, 1999. NORCAL used electromagnetic terrain conductivity, ground penetrating radar, and electromagnetic line locating methods for each survey. Appendices C and D contain letter reports by NORCAL, dated April 2, 1999 and June 7, 1999, respectively. Results of the geophysical survey are shown on Figure 6-1.

USTs beneath Southeast Corner of Building 56A. The geophysical survey assessed the presence of the USTs and associated piping beneath the southeast corner of Building 56A. This survey was conducted as part of the Building 53 field investigation in March 1999 and details are summarized in the Final Technical Memorandum, Field Site Investigation for Area I Fuel Facilities at Buildings 53, 73, 103, and 154 (FA/BC, 2000).

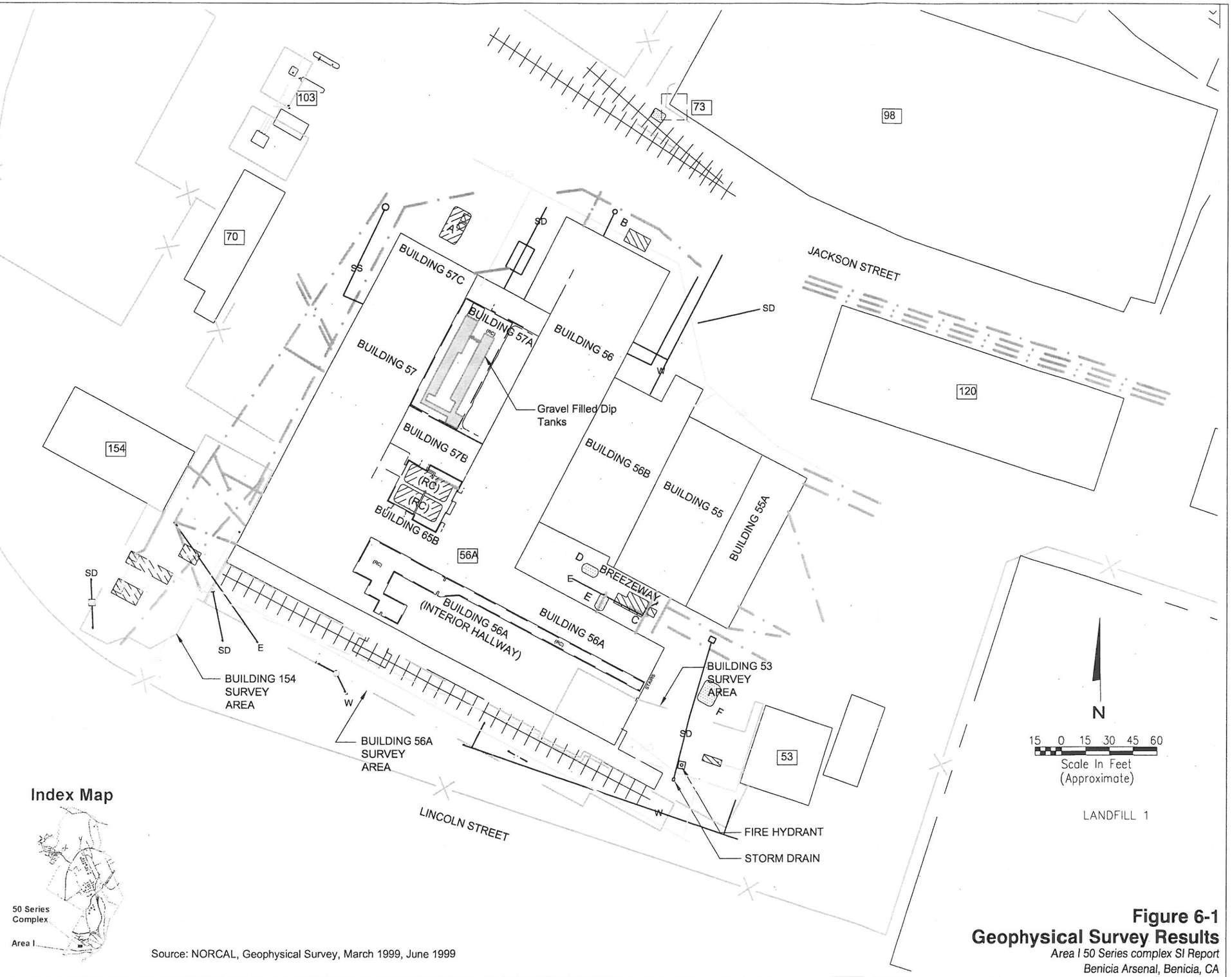
The survey was designed to assess the location of a suspected 1,000-gallon diesel fuel UST and a 10,000-gallon high octane gasoline UST, reportedly installed as part of the Building 53 fueling system beneath the southwest corner of Building 56A (Figure 1-4).

The interior geophysical survey was inconclusive, probably due to the elevated floor of Building 56A. Geophysics did identify fueling system pipelines, which were traced from Building 53 under the southeast corner of Building 56A and connecting with the Building 154 USTs. It is unknown if these pipelines connect to any of the suspected USTs at Building 56A. Based on the results of the geophysical survey, borings B053SB001 and B053SB002 were placed at the east and south sides of Building 56A, closest to the suspected location of the USTs.

Perimeter Survey. An approximately 30-foot-wide geophysical survey was conducted around the perimeter of the 50 Series Complex. The survey was intended to locate suspected cisterns and to identify underground utilities to clear boring locations. The records indicate the cisterns were brick-lined, so geophysical techniques would not provide conclusive evidence. Cisterns were located around the perimeter of complex and if they were filled with concrete or metallic debris, geophysics would show a significant anomaly. However, no anomalies were found that could not be attributed to other known subsurface structures (e.g. utilities, buried concrete ramps).

LEGEND

- 181 Buildings
- Railroad Tracks
- Concrete/Metal Vault Lid
- Storm Drain
- Manway
- Limit of Survey Area
- GPR Anomaly Representing Possible UST
- EMLL Anomaly Representing Near Surface Metal
- GPR Anomaly
- EMLL Anomaly Representing Possible UST
- E Electric Line
- Natural Gas Line
- SD Storm Drain
- SS Sanitary Sewer
- UST Associated Line
- W Water Line
- Undifferentiated Utility Line
- Possible Utility Alignment as Defined by GPR



Index Map

Source: NORCAL, Geophysical Survey, March 1999, June 1999

Figure 6-1
Geophysical Survey Results
Area I 50 Series complex SI Report
Benicia Arsenal, Benicia, CA

USTs (Building 120). The geophysical survey was conducted along the north side and within the interior northwest corner of Building 120. The survey data did not show any parabolic signatures that would indicate the presence of USTs beneath the concrete floor of this building. The USTs, if present, would likely have been removed for the construction of Building 120.

Former Building 65(A) - Boiler House and Small Arms Shop (1st Floor Corridor of Building 56A). The purpose of this geophysical survey was to evaluate the thickness of the concrete slab to plan sampling activities and to avoid underground piping and utilities. The survey conducted in the interior corridor of Building 56A identified typical patterns associated with the reinforced concrete and deeper reflective patterns characteristic of uniform subsurface soil. Underground utilities were not identified and the thickness of the concrete slab could not be determined conclusively. This survey did not identify any features that would indicate the presence of former Building 65(A) or an associated UST.

Former Building 65(B) – Boiler House. A geophysical survey was conducted to locate suspected USTs associated with the former Building 65(B) Boiler House. Data from the survey indicate subtle parabolic reflections beneath the concrete floor. FA/BC contacted NORCAL regarding these parabolic reflections. NORCAL indicated that these reflections may indicate the presence of the buried floor or the presence of USTs, but evidence is not conclusive. If the parabolic reflections are USTs, the data indicate that they are orientated east-west side by side and are estimated to be 15,000-gallon to 25,000-gallon in size.

Breezeway between Buildings. Two magnetic anomalies, designated as "D" and "E", were identified during the geophysical survey in the breezeway between Building 55, Building 56C and Building 56A (Figure 6-1). A broad reflective near-surface pattern that is typical of a concrete slab or possible cistern identifies anomaly "D." Anomaly "E" is defined by hyperbolic reflections that are typical of a large utility or a small UST orientated north-south. Based on this information, two hand auger borings (B065BHA004 and B065BHA005) were added to the sampling program to investigate these anomalies.

Parkerizing Vats (Building 57A). The purpose of the survey was to determine if the U-shaped vat still exists and to determine where an 18-inch-diameter standpipe at the southern end of Building 57A leads. Geophysical results do not indicate the presence of any other dip tanks within Building 57A. Visual evidence of the U-shaped vat was evident at the ground surface. Lateral piping from the standpipe were not detected during the survey. Based on this evidence, it is likely that the standpipe was placed inside the U-shaped vat before it was filled with gravel. Mr. Bill Scattergood, an employee of UNICO Services, confirmed this interpretation of the standpipe.

6.2 Summary of Analytical Results

This section presents the results for soil, soil gas and groundwater samples collected during the site investigation at the 50 Series Complex.

A total of 188 soil samples, 12 soil gas samples, one grab groundwater and 13 in-situ groundwater samples were collected. Table 6-1 is a reference table that summarizes the soil, soil gas, and groundwater analytical methods and refers to the table, figure, and appendix in which the data is presented. Tables 6-2 through 6-12 and Plates 9 through 15 are provided with values greater than MDLs. These tables are organized by analyte type (i.e., VOCs, SVOCs, PAHs, TPH) and then by matrix (i.e., VOCs for soil, soil gas, and groundwater) and are included at the end of this chapter for convenience. The plates are included in Appendix B. Appendix I presents a legend for the acronyms used in Appendices J, K, and L. Appendices J, K, and L contain all results, both detected values and non-detected values. Sample counts presented in the following sections do not include quality assurance/quality control (QA/QC) samples. Additionally, particle size analysis was performed on two soil samples. Results are included in Section 4.3.

Table 6-1. Reference Matrix for Analytical Methods by Matrix

	(VOCs [with oxygenates])	SVOCs	PCBs	PAHs	Nitroaromatics and Nitroamines	Gasoline, diesel fuel and motor oil	Metals *	pH	Anions **	Alkalinity	Cations***	Total Organic Carbon	Total Dissolved Solids
Soil													
EPA Method #	8260B	8270C	8082	8310	8330	8015B	6010B, 7041, 7060A, 7196, 7740, 7841	9045	E300.0	A2320	6010B	Walkley-Black	--
Table	6-2	6-5	--	6-7	--	6-9	6-11	4-3	4-3	4-3	--	--	--
Plate	9	12	--	12	--	12	14	3	3	3	--	--	--
Appendix	I (all soil results)												
Soil Gas													
EPA Method #	TO-14	--	--	--	--	--	--	--	--	--	--	--	--
Table	6-3	--	--	--	--	--	--	--	--	--	--	--	--
Plate	10	--	--	--	--	--	--	--	--	--	--	--	--
Appendix	J (all soil gas results)												
Groundwater													
EPA Method #	8260B	8270C	8082	8310	8330	8015B	6010B, 7041, 7060A, 7196, 7470A, 7740, 7841	--	E300.0	A2320	6010B	--	E160.1
Table	6-4	6-6	--	6-8	--	6-10	6-12	--	4-9	4-9	4-9	--	4-9
Plate	11	13	--	13	--	13	15	--	6	6	--	--	6
Appendix	K (all groundwater results)												

* Metals include antimony, arsenic, barium, beryllium, cadmium, total chromium, cobalt, copper, lead, manganese, mercury, molybdenum, nickel, selenium, silver, thallium, tin, vanadium, and zinc.
** Anions include chloride, nitrate (as nitrogen), nitrite (as nitrogen), sulfate, and bicarbonate.
*** Cations include calcium, magnesium, sodium, potassium, and iron.
EPA = Environmental Protection Agency
Tables and Plates show analyte concentrations above method detection limits.

Plate 8 summarizes the detected results by analytical grouping, which include VOCs, SVOCs, PAHs, TPH, metals, and explosives. A matrix is placed at each boring location with soil, soil gas and groundwater in rows and the analytical groups in columns. A box is filled in when a sample has a detected value above MDLs. In general, this plate shows that VOCs, TPH, and metals are prevalent throughout soil and groundwater at the 50 Series Complex. Metals are expected in soil because they are naturally occurring. VOCs were also found in every soil gas sample. The subsections below review these findings and discuss the possible sources of these chemicals. Additionally, data from other investigations in the area of the 50 Series Complex is also used to support these findings.

6.2.1 *Parkerizing and Degreasing Locations*

The purpose of the investigation around the former parkerizing and degreasing and activities was to determine if possible releases of solvents from vats and surface spillage in Building 57A and 56 have impacted soil and groundwater at the 50 Series Complex. The sampling locations were determined using visual evidence from site surveys and interviews of former employees.

Visual evidence included pitted and discolored concrete floors in Building 56 and the presence of the vats in Buildings 56 and 57A. The concrete floor in Building 56 was discolored with swirls of green and white. The discoloration and pitting was likely due to spills from manganese, zinc, or iron phosphate solutions used in the parkerizing process. Evidence of similar discoloration and pitting of the concrete is not as evident in Building 57A because these types of chemicals were not likely used in Building 57A. Even though physical evidence of spillage is not apparent in Building 57A, interviews with former employees indicate that spillage of chemicals occurred in both buildings. The vats in Buildings 56 and 57A are still present. During the field surveys, the integrity of the vats could not be inspected. The Building 56 vat was covered with a wooden top that could not be easily removed because a wall had been installed on top of the cover. At the time of the field survey for this investigation, the Building 57A vat was completely filled in with gravel. Subsequently, the landowner has covered the vat with concrete.

Building 57A. The highest concentrations of solvents detected in soil and soil gas is near the deepest end (southern end) of the parkerizing vat in Building 57A. According to the landowner, the vat floods with groundwater during times of heavy rains. An 18-inch standpipe was installed into the deepest portion of the vat to drain water. The standpipe has since been removed. Samples from two borings (B057AHP008 and B057ASB001) and one grab sample from the water in the standpipe (B057AGR001) indicate high levels of VOCs in soil, soil gas and water from the vat. Prominent detected VOCs include TCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride. A previous investigation in 1994 reported similar concentrations in soil. The 1994 soil investigation included data from ten borings (17 soil samples) in Building 57A (Plate 1). TCE was reported in 12 of the 17 soil samples. The maximum TCE value in soil was 82.5 mg/kg in B4 (15 feet bgs). Other reported VOCs included chlorobenzene, methylene chloride, and trans-1,2-DCE. In 1999, TCE was reported in every sample. The maximum TCE concentration was 82 mg/kg at 19.3 feet bgs (Table 6-13).

TCE in soil at B057ASB001 increased with depth as shown Table 6-13. Corresponding TCE in soil gas at 6 feet bgs is 140,000 parts per billion by volume (ppbv) (Plate 10). Other detected VOCs in soil gas were TCE degradation products, cis-1,2-DCE at 29,000 ppbv, and trans-1,2-DCE at 12,000 ppbv (Plate 10).

Table 6-13. Concentration of TCE in Boring B057ASB001

Depth (feet bgs)	TCE Concentration (mg/kg)
3.3	0.25
11.3	38
19.3	82

Phenanthrene was detected in soil at a maximum concentration of 0.013 mg/kg. Fluorene was detected in groundwater at 1.4 µg/L. Two PAHs, phenanthrene and fluorene, were also detected in soil and groundwater samples collected. These detections may be a result of post-Arsenal activities. Standard Transmission occupied Building 57A in 1973 and used if to warehouse automotive parts and rebuild transmissions.

The Building 57A vat is a likely source of VOCs in groundwater extending from beneath the 50 Series Complex to the outside perimeter based on the detected values of VOCs in soil, soil gas, and groundwater. However, higher TCE concentrations were found southwest of Building 57A at B057HA004 and B057AHP004. TCE concentrations in groundwater were 390 µg/L at Building 57(A), while TCE concentrations at B057HA004 and B057HA004 were 8,500 µg/L and 3,800 µg/L, respectively. Based on these groundwater concentrations, there is likely another source of VOCs in groundwater.

Building 56. Four additional borings were advanced around suspected parkerizing locations in Building 56. The borings (B056SB001 through B056SB004) were drilled on the ground floor of Building 56. Two of those borings, B056SB001 and B056SB002, were sampled to assess the possible release of process fluids from a parkerizing/oakite dip tank.

Lead was detected in soil at B056SB001 at 6,360 mg/kg (0.5 feet bgs). The deeper sample at 5 feet bgs contains 7.55 mg/kg lead (Plate 14). TCE, acetone, chloroform, and cis-1,2-DCE were the predominant VOC compounds detected in soil. TCE was detected in every soil sample. The maximum concentration of TCE (6.9 mg/kg) was detected in B056SB004 at 0.8 feet bgs. TCE concentrations decrease with depth as shown in Table 6-14 for B056SB004. Otherwise, TCE was detected at very low concentrations in the other samples (maximum of 0.11 mg/kg in B056SB003 at 1.5 feet bgs).

Table 6-14. Concentration of TCE in Boring B056SB004

Depth (feet bgs)	TCE Concentration (mg/kg)
0.8	6.9
5.3	0.009
9.5	0.021

The only fuel detected above MDLs was motor oil at a concentration of 440 mg/kg in the surface soil sample at B056SB004. All other results for fuels were less than 50 mg/kg.

The PAHs, phenanthrene and pyrene, were detected in soil in B056SB002 through B056SB004.

VOCs were also detected in groundwater beneath Building 56. TCE concentrations in groundwater are also elevated in the area just north of the complex, near Building 56. B056SB002 and B057AHP003 reported elevated concentrations of TCE in groundwater at 37 µg/L and 550 µg/L, respectively. However, the highest concentration of TCE was from boring B056SB003, located approximately 40 feet southwest of the Building 56 vat. TCE was detected at 2,200 µg/L in B056SB003 (Plate 11). Based on the trend of TCE concentrations in groundwater beneath Building 56, it appears that the vat is not the source of the solvents in groundwater. As stated previously for Building 57A, the source of solvents in groundwater may be from multiple sources. The source of solvents in groundwater beneath Building 56 is not known.

Based on this data, there appears to be no significant surface release of VOCs as a result of former parkerizing activities in Building 56, but a subsurface release from the parkerizing/oakite dip tank can not be eliminated.

6.2.2 *Boilers*

A stated in Section 6.1, results from the geophysical surveys were not conclusive in the identification of any USTs associated with the boilers in former Building 65(A) and Building 65(B). The following subsection will review the analytical data to determine if concentrations indicate a source from the former operations at these buildings.

Building 58 and Building 65(A). B056AHA001 and B056AHA002 were sampled to assess if fuels from the former Boiler House (Building 65(A)) or the former Boiler Room/Small Arms Storage (Building 58) was released to the subsurface. Diesel, gasoline, motor oil, lead, and several PAHs were detected in soil samples from borings B056AHA001 and B056AHA002 (Table 6-15). VOC concentrations in soil gas in both borings were less than 1,000 ppbv.

Table 6-15. Petroleum Hydrocarbon and Lead Concentrations in Soil near Former Building 58 and Building 65(A)

Boring	Depth (feet bgs)	Concentration (mg/kg)			
		Gasoline	Diesel fuel	Motor oil	Lead
B056AHA001	0.7	<0.22	73	500	306
	4.5-5	3.3	4,700	11,000	8.68
B056AHA002	0.1	<0.21	65	120	397
	4.5-5	0.41	240	1,100	126

The presence of petroleum hydrocarbons, PAHs, and lead in soil may indicate a surface release of fuels from the former boiler houses. The presence of TPH in soil at the deeper depths beneath

Building 56A is likely due to capillary action of shallow groundwater in clay or from the former boiler house at Building 65(A).

Building 65(B) and the Breezeway. The subsurface investigation included one hand auger boring (B065BHA002) located inside the courtyard area at a suspected machine gun test firing area, which is approximately 25 feet southeast of the suspected locations of the USTs and 2 borings (B056AHA003 and B056AHA004) in the breezeway. Petroleum hydrocarbons were detected in soil as shown in Table 6-16.

B065AHA003 was located in the middle of an area of soil removed from the boiler room at Building 65(B). VOCs, PAHs, petroleum hydrocarbons, and lead were detected in soil at concentrations shown in Plates 9, 12, and 14, respectively. Additional descriptions of TPH is included in Section 6.2.8. However, lead and motor oil were the only analytes identified in soil at elevated concentrations (Table 6-16).

Table 6-16. Diesel Fuel/Motor Oil/Lead in Soil (mg/kg)

Depth (feet bgs)	B065BHA002	B065BHA003	B065BHA004
1-2	NA/NA/481	120/970/550	34/370/276
3-6	NA/NA/30.6	45/480/164	<1.2/<23/6.79
9.5	16/84/15.2	NA	NA

NA – not analyzed

A third geophysical survey was conducted to locate underground utilities and cisterns in the breezeway. Two magnetic anomalies, designated as "D" and "E," were identified, Figure 6-1. As a result, two additional borings were added to the sampling plan to address these anomalies (B065BHA004 and location B065BHA005). There was no evidence of a concrete slab or cistern to a depth of 6.2 feet bgs at B065BHA004. Concrete was encountered at 1 foot bgs at location B065BHA005, which is the likely reason for the magnetic anomaly. Due to presence of concrete, no samples were collected at B065BHA005.

Boring B065AHA004 is located approximately 20 feet east of B065BHA003. Diesel and motor oil was also detected in soil at similar concentrations to B065BHA003 (Table 6-15). Lead was detected at 550 and 164 mg/kg at 1 foot bgs and 3 feet bgs, respectively and motor oil concentrations were 970 mg/kg and 450 mg/kg at the same depths. Diesel fuel was less than 120 mg/kg.

These results indicate the soil is impacted with residuals that are likely from the boiler house. Groundwater was not encountered in any of these borings.

6.2.3 *Degreaser and Oil/Water Separator*

Two borings were advanced at the location of former degreaser and oil/water separator to assess the potential impact to soil and groundwater from solvent leakage. The first boring, B057AHP007, was drilled near a continuous degreaser, located along the western side of Building 57. Drilling could not

continue through hard quartzite encountered at 26.5 feet bgs, so the boring terminated at 27 feet bgs without encountering groundwater. Low concentrations of VOCs (Plate 9) were detected in soil. There was no visual evidence of staining, discoloration, or elevated PID readings that would indicate an impact to soil or groundwater at this location.

A second boring was drilled near the oil/water separator along the western side of Building 57C. Samples collected from boring B057AHP001 reported low concentrations of VOCs (Plate 9) and TPH (Plate 12). Drilling was terminated into sandstone at 30 feet bgs without encountering groundwater. VOCs (Plate 9) and TPH (Plate 12) concentrations were low.

Based on these results, there is no evidence of a release from degreaser or the oil/water separator.

6.2.4 *Test Firing Ranges and Small Arms Repair/Retinning and Storage*

Three test firing ranges are located in the basement of Building 57 and a suspected machine gun test firing range was located in Building 65(B). Small arms repair/retinning and storage was performed in former Building 58. The purpose of this investigation was to determine the impact to soil from test firing of small arms and repair and storage of munitions.

Soil samples were collected in Building 57 at the north end of three firing ranges (B057HA001 through B057HA003) and two basement areas with exposed soil (B057HA004 and B057HA005). A summary of these maximum concentrations is shown in Table 6-17.

As previously discussed in Section 6.2.1, very high concentrations of arsenic, antimony, copper, and lead were measured in the gunite target material.

Table 6-17. Maximum Concentrations of Metals in Soil and Groundwater in the Building 57 Firing Ranges and Nearby Locations

Analyte	Gunite Target Material Concentration (mg/kg)	Groundwater Concentration (mg/L)
Arsenic	8.49 (B057HA001)	0.0058 (B057HA004)
Antimony	3,040 (B057HA001)	0.021 (B057HA004)
Copper	198,000 (B057HA003)	0.0112 (B057HA004)
Lead	151,000 (B057HA003)	0.023 (B057HA004)

Groundwater was encountered at only one boring, B057HA004, at 0.5 feet bgs. Lead was detected at a concentration of 0.023 mg/L. Since groundwater is near the surface (approximately 0.5 feet bgs) at this location, there is potential that the lead from the nearby firing ranges was introduced directly into the water.

At a suspected machine gun test firing area, one hand auger boring (B065BHA002) was advanced inside the courtyard area just north of Building 56A. Petroleum hydrocarbons and arsenic were detected, and the concentration of lead reported was 481 mg/kg at 0.5 feet bgs. This suggests an impact of lead to soil at this location from the suspected machine gun test firing area.

At former Building 58, boring B056AHA002 was sampled to assess subsurface impacts from small arms repair/retinning and storage. Lead concentrations in soil were between 306 mg/kg to 8.68 mg/kg at depths of 0.7 to 4.5 feet bgs (Plate 14). Groundwater was not encountered in any of these borings. The maximum concentration of lead detected in soil is shown in Table 6-18.

Table 6-18. Concentrations of Lead in Soil at Boring B056AHA002

Depth (feet bgs)	Concentration (mg/kg)
0.1	397
4.5	126

Elevated concentrations of lead in soil may indicate a surface release from the former Boiler Room/Retinning and Small Arms shop activities at Building 58.

6.2.5 *Cisterns*

As discussed in Section 6.1, the geophysical survey did not identify any of the suspected cisterns believed to be located around the perimeter.

6.2.6 *Foundry Facilities*

Borings B056BHA002 through B056BHA004 were sampled to assess a possible release of solvents and metals to shallow soil as a result of foundry activities within Building 56B. Arsenic, chromium, copper, and lead were reported at elevated concentrations in soil. Arsenic was detected in seven of the eight soil samples at concentrations ranging from 8.8 mg/kg to 14.9 mg/kg, similar to other arsenic values found for this investigation. The ambient concentration for arsenic is 15.5 mg/kg. Arsenic in sample B056BHA003 was 65.2 mg/kg (at 4.5 feet bgs). The arsenic levels in these borings do not exceed the ambient metal concentration and do not indicate a release to soil, except for the sample in B056BHA003 at 4.5 feet bgs. Lead was found at 58.5 mg/kg in this same sample. Other samples contained maximum concentrations of chromium at 58 mg/kg and copper at 38.5 mg/kg.

These borings were not advanced to groundwater because the potential contaminants were not expected below the near surface.

6.2.7 *Forges and Hydraulic Press Locations*

A subsurface investigation was conducted in Building 55, which included four soil borings (B055HA001, B055HA002, B055HA003 and B055SB001) to address the potential surface release of fuels and metals from two suspected forges and a former hydraulic press. B055HA001 was advanced in the utility tunnel beneath this building; the results of the utility tunnel investigation is discussed in Section 6.2.9. Potential contaminants were not expected at depth; therefore the soil borings were not advanced to groundwater.

VOC concentrations in soil gas from 6.5 feet bgs in B055SB001 were less than 20 ppbv. Petroleum hydrocarbons were detected in all three borings as shown in Table 6-19. Low concentrations of TCE (less than 2.1 mg/kg) was reported in shallow soil.

Table 6-19. Petroleum Hydrocarbons Reported in Soil at Building 55

Boring	Depth (feet bgs)	Diesel Fuel (mg/kg)	Motor Oil (mg/kg)
B055HA001	0.5	1,900	16,000
B055HA002	0.5	9.6	87
	4.0	19	57
B055HA003	0.5	15	120
B055SB001	0.5	8.4	200
	6.5	6.8	<23
	10.0	1.8	<23
B057AHP002	0.5	200	520
	5.5	4.4	<15
	10.5	0.88	<23
	20.5	5.3	<23

Diesel fuel and motor oil were detected in soil beneath the blacksmith shop at Building 55 (Table 6-19) and approximately 20 feet south of the building at B057HP002 (Plate 12). The extent of the diesel and motor oil in soil extends beneath most of Building 55 with the highest concentrations beneath the southern half in the utility tunnel and extending south of the building (Plate 12). Petroleum products are common in the other samples from the utility tunnel. In addition to the sample beneath Building 55, diesel and/or motor oil was identified in all samples (concentrations range from 6.1 mg/kg to 880 mg/kg) in the utility tunnel. Gasoline was not detected in any of the soil samples at Building 55 or in B057AHP002. Gasoline was detected in groundwater at 2,300 µg/L in B057AHP002. In addition, diesel fuel concentrations were 380 µg/L. The source of the TPH in groundwater at this location is unknown. Diesel fuel and gasoline have also impacted the groundwater at B057AHP003 located approximately 60 feet north of Building 55. There are no other groundwater samples between B057AHP002 and B057AHP003 to confirm whether these two detections are connected.

Lead was detected in soil (1,640 mg/kg) at a depth of 0.5 feet bgs in B055HA002 (Plate 14). The lead concentration was 7.01 mg/kg in the deeper sample at B055HA002 (4 feet bgs). Lead appears to have impacted surface soils at Building 55. Samples from B055SB001, located between the

suspected locations of two forges, had much lower lead concentrations (maximum concentration of 32.8 mg/kg) at 0.5 feet bgs.

In summary, there is evidence of a surface release of metals, in particular lead, TCE, and fuels to soil in the area of the two suspected forges. Predominantly motor oil is present in soil beneath Building 55. The use of oils would be consistent with maintenance of the equipment at the former forges and hydraulic press in Building 55. Diesel and gasoline are in groundwater north and south of Building 55. As borings at Building 55 were not advanced to groundwater, it is unknown if the groundwater beneath Building 55 contains petroleum hydrocarbons.

6.2.8 *USTs/ASTs*

Several USTs and ASTs, either suspected or known to exist, were located throughout the 50 Series Complex. In areas of former or suspected USTs, TPH concentrations in soil and groundwater are elevated at three locations, Building 53, former Building 65(A), and Building 120 (Plates 12 and 13).

Building 53. The former UST at Building 53 has impacted soil and groundwater. Building 53 is located near the southeast corner of Building 56A. Gasoline, diesel fuel, motor oil, and PAHs concentrations above MDLs were detected in soil and groundwater samples from two borings located at the southeast of the 50 Series Complex (B053SB001 and B053SB002), from a trench (B053TR001) and from an excavation during the UST removal (Table 6-20). B053TR001 is located in the area of a known 2,500-gallon UST and samples B053SB001 and B053SB002 are located approximately 65 feet and 100 feet west of B053TR001.

Table 6-20. TPH Concentrations Located near former USTs at Building 53

Boring	Soil Concentration (mg/kg)			Groundwater Concentration (□g/L)		
	Gasoline	Diesel Fuel	Motor Oil	Gasoline	Diesel Fuel	Motor Oil
B053TR001*	24	74	560	1,300	3,500	<240
B053SB001	<0.2	520	5,400	<12	55	<54
B053SB002	<0.2	16	67	<12	100	<54
B53**	6,000	4,000	<560	3,460	5.26	<2.5

* Data from an investigation in June 1999 (FA/BC, 2000).
** Data from an investigation during UST removals in March 2002 (MWH, 2002).

Former Building 65(A). Four borings were advanced at Building 56A to investigate USTs within the former boiler room. The highest concentration of TPH was a reported motor oil concentration of 11,000 mg/kg in B056AHA001 at a depth of 4.5 feet bgs to 5.0 feet bgs (Table 6-21). Groundwater was not encountered in any borings in Building 56A.

Table 6-21. TPH Concentrations Located near former USTs at Building 154

Boring	Soil Concentration (mg/kg)			Groundwater Concentration (µg/L)		
	Gasoline	Diesel Fuel	Motor Oil	Gasoline	Diesel Fuel	Motor Oil
B154TR002*	82	1,100	280	16,200	3,900	<1,100
B154TR003*	5,790	390	540	24,300	3,300	4,100
B154TR006*	1.21	700	260	NS***	NS***	NS***
B056AHA001	3.3	4,700	11,000	NS***	NS***	NS***
B056AHA004	4.72	1,400	3,800	NS***	NS***	NS***
B056AHA002	0.41	240	1,100	NS***	NS***	NS***
B057AHP006	2.03	110	750	<12	51	<55
B154**	70	NS	NS	1,800	NS	NS

* Data from an investigation in June 1999 (FA/BC, 2000).
** Data from an investigation during UST removals in March 2002 (MWH, 2002).
*** Not planned for groundwater sample.
NS – Not Sampled

Gasoline was detected at relatively low concentrations (maximum soil concentration of 4.72 mg/kg in boring B056AHA004) in soil samples collected in borings from within Building 56A. Concentrations are much higher in soil samples collected from the area of the Building 154 USTs, with a maximum concentration of 5,790 mg/kg (Plate 12). Soil samples from borings B154TR002 and B154TR003 contained elevated concentrations of gasoline in groundwater at 16,200 µg/L and 24.3 µg/L, respectively (Plate 13). The presence of TPH in soil beneath Building 56A is likely due to capillary action of shallow groundwater in clay or from the former boiler house at Building 65(A). Depth to groundwater in the nearest well (B057AHP006) ranged between 2 feet and 3.5 feet.

Based on the high soil and groundwater concentrations, the Building 154 USTs are the likely source of the petroleum hydrocarbons in this area. However, the boiler house at former Building 65(A) was also located beneath the southwestern portion Building 56A. The presence of diesel fuel and motor oil may also be from former Building 65(A). However, the former boiler house is likely not the source of the gasoline, which was not used at the Arsenal until after former Building 65(A) was demolished.

Building 65(B). Two soil borings were planned to investigate a suspected UST associated with the former Boiler Room at Building 65(B). Only one boring, B065BHA002 was advanced in Building 65(B). The other boring, B065BHA001, was planned in the area of the suspected USTs, but during the field investigation, the landowner indicated this area contains an existing concrete floor over several feet of fill which overlie an older subfloor. Because of the logistical difficulties of penetrating through the floor, the USACE, RWQCB, DTSC, and FA/BC agreed to deepen B065BHA002 to 15 feet and eliminate B065BHA001.

The boring, B065BHA002, was also planned to assess the suspected machine gun test firing area. PAHs, TPH, and lead were detected (Plates 12 and 14). Diesel and motor oil concentrations were 16 and 84 mg/kg. Lead was detected at a concentration of 481 mg/kg at 0.5 feet bgs. The elevated lead concentration is addressed in Section 6.2.4.

These results indicate the soil is impacted with TPH and it is likely from the suspected USTs at the former Boiler House. The boring was not advanced to groundwater.

Building 120. A former UST was located at Building 120, it has been suspected that two additional USTs were also located near Building 120. As discussed in Section 6.1, the results of the geophysical survey data did not show any parabolic signatures that would indicate the presence of USTs beneath the concrete floor of the building.

Two borings (B120SB001 and B120SB002) were drilled on the north side of the former UST at Building 120. During drilling, a hydrocarbon-like odor and an elevated PID reading of 200 parts per million (ppm) was observed from the saturated clay soil below 4 feet bgs. Above the water table (5 feet bgs), the soil (sandy clay-like gravel) was not visually stained and had no odor.

The maximum diesel fuel concentration reported in soil was 110 mg/kg at 4 feet bgs in B120SB002 (Plate 12). Reported concentrations of diesel fuel in groundwater were 130 µg/L and 2,000 µg/L in B120SB001 and B120SB002, respectively (Plate 13).

Diesel fuel was also encountered in groundwater 130 feet west of Building 120 in sample B057AHP003 and 210 feet northwest of Building 120 in boring B073TR001 with concentrations of 1,300 µg/L and 160 µg/L, respectively. The sources of diesel fuel in these two samples are indeterminable based on the data collected from this investigation.

Motor oil was detected in soil samples from borings B120SB001 and B120SB002, as shown in Table 6-22. Motor oil was also detected in a groundwater sample from B120SB001 at a concentration of 2,800 µg/L. The source of the motor oil at B120SB001 may be the former UST at Building 120.

Table 6-22. TPH Concentrations Located near Building 120

	Soil Concentration (mg/kg)				Groundwater Concentration (µg/L)		
Boring	Depth Sampled (feet bgs)	Gasoline	Diesel	Motor Oil	Gasoline	Diesel	Motor Oil
B120SB001	4.5-5.0		16	160	<12	130	2,800
B120SB002	4.0-4.7	1.3	110	730	<12	2,000	<53
B057AHP003	20.5-21		3.5	<16	51,000	1,300	<54
B073TR001*					1,370	160	

* Data from an investigation in June 1999 (FA/BC, 2000).

In summary, the soil at Building 120 shows some petroleum hydrocarbons in the capillary fringe, but the soil above the water table does not appear to be impacted. This suggests that the petroleum hydrocarbons in the groundwater may have migrated to this area.

6.2.9 *Miscellaneous Features*

This section describes borings advanced near other features at the 50 Series Complex: a utility tunnel, a paint shed/shop/incinerator/smoke stack, underground utility lines, a transformer room, and a tool house.

Utility Tunnel. The utility tunnel extends from west to east beneath Buildings 57B, 56, 56B, and 55. Portions of the tunnel beneath Buildings 57B, 56B, and 55 are narrow (approximately 10 feet wide). No visual evidence of staining or poor housekeeping was noted, except for the area beneath Building 55. Access to the Building 55 portion of the tunnel is available through a small opening in the floor and a set of stairs from the ground floor. At the base of the stairs there are small piles of rubble (i.e., brick) and discolored soil. The steps of the stairs were stained.

Data was collected from four hand auger borings (B055HA001, B056BHA001, B056HA002, and B057BHA001) along the utility tunnel to address the potential release of solvents from parkerizing processes on the ground floor at Building 56. Elevated concentrations of petroleum hydrocarbons, PAHs, and lead were detected in soil at boring B055HA001. Results are shown on Table 6-23 and Plates 12 and 14. The presence of diesel fuel, motor oil, and lead were anticipated due to the proximity of the former fuel-related hydraulic stamp and metal working practices that occurred in Building 55. The use of oils would be consistent with maintenance of the equipment at the former foundry and hydraulic press in Building 55. Deeper samples in this boring was not collected due to shallow bedrock at 1 foot bgs.

The lateral and vertical migration of contaminants at these locations is likely limited by the shallow bedrock and by brick walls on all sides. It is possible the petroleum hydrocarbons and lead were washed, spilled or dumped into the access door during cleaning activities within Building 55.

Lead concentrations, shown in Table 6-23, were elevated in surface soils of borings B055HA001, B056HA001 and B056HA002 (Plate 14). Likewise, diesel fuel and motor oil are reported at elevated concentrations in surface soils for boring B056HA004, as shown in Table 6-23.

Table 6-23. Petroleum Hydrocarbon and Lead Concentrations in Borings in the Utility Tunnel

Boring	Depth	Concentration (mg/kg)		
		Lead	Diesel Fuel	Motor Oil
Preliminary ambient concentration	(feet bgs)	18.0	Not applicable	Not applicable
B055HA001	0.5	1,360	1,900	16,000
B056HA001	0.6	2,100	<1.2	<16
	3	36.3	4.1	<23
B056HA002	0.3	979	74	<24
	3	94.1	<1	880
B056HA003	0.3	8.3	<1.9	<24
	4	17.5	<3.8	<16
B056HA004	0.6	9.06	5,100	9,900

Based on these data, elevated concentrations of lead and fuels were found in areas of localized impact. As such, it is difficult to determine if these COIs are related to a petroleum release from the ground floor, except for the obvious staining found at B056HA004. Soil gas concentrations of VOCs at 3 feet in B056HA003 were less than 30 ppbv.

In addition to B056HA004, a grab sample (B056GR001) was added to the investigation based on field evidence of a pile of left-over sandblasting materials in the utility tunnel beneath Building 56. The pile is not soil, and the arsenic, copper, and lead levels were elevated (16.1, 1,790, and 493 mg/kg), respectively. Preliminary ambient concentrations for arsenic and lead are 15.5 mg/kg and 18.0 mg/kg, respectively. Therefore, arsenic and lead are COIs for the sand blasting material. No other metals detected in the blast-out material were elevated.

One boring (B057HA004) was advanced to groundwater in the utility tunnel. The highest concentration of TCE (8,500 µg/L) in groundwater at the 50 Series Complex was measured in this boring. B057HA004 also contain elevated concentrations of cis-1,2-DCE (2,000 µg/L). The lead concentration for B057HA004 was 0.023 mg/L.

The contaminants identified in groundwater are likely the result of activities associated with the Arsenal's use and are discussed in Sections 6.2.2 and 6.2.5. There is no direct evidence of releases from the ground floor into the basement soil, except at B056HA004. Lead concentrations are elevated throughout the surface soil. Arsenic and lead concentrations are elevated in the left-over materials from former sandblasting operations.

Paint Shed/Smoke Stack/Incinerator. One soil boring (B066ASB001) was drilled west of the former smoke stack/incinerator and within the suspected outline of former Building 66(A). The purpose of this boring was to assess the potential impact of explosives and metals from the former Smoke Stack/Incinerator and metals and oils stored in the former Paint Shed/Shop at Building 66(A).

Physical evidence of the Smoke Stack/Incinerator is present in the form of a square concrete pad and remnants of a circular supporting structure. Several utilities are located in the area of B066ASB001. No anomalies were found during the geophysical survey. Analytical data for petroleum hydrocarbons, metals and explosives indicate no impact to surface or subsurface soil.

Transformer Room. B056AHA005 was sampled to assess the potential release into surface soil from the former transformers in the basement of Building 56A. Samples were not analyzed deeper than 4 feet bgs because chemicals from transformers were expected only in surface soil.

The maximum petroleum hydrocarbons concentrations reported from boring B056AHA005 is less than 50 mg/kg, the maximum lead concentration is less than 12 mg/kg and PCBs are less than MDLs in soil. Based on this evidence, there appears to be no release to subsurface soil in the transformer room.

Tool House. Activities at former Building 59(A) included a subsurface investigation to assess the potential impact to soil and groundwater from oils that were stored at this location. Boring B053SB001 is located in the area of the former tool house. As discussed in Section 6.2.9, elevated concentrations of diesel fuel and motor oil were reported. Benzo(b) fluoranthene, dibenz(a,h)anthracene and indeno(1,2,3-c,d)pyrene were detected in soil.

One boring (B053SB001) was advanced to groundwater near the former tool house. Results indicated elevated concentrations of TCE, cis-1,2-DCE, trans-1,2-DCE, and diesel fuel in groundwater (Plates 11 and 13).

Equipment Room. One soil boring (B056AHA004) was sampled to assess the potential release of fuels that may have been stored in the Equipment Room in Building 56(A). Staining was observed and elevated PID readings were recorded in B056AHA004. PID readings were 100 ppm at 1 foot bgs, 2,000 ppm at 3 feet bgs, and 80 ppm at 4 feet bgs. A "fruity" odor was also noted.

Several PAHs, diesel fuel, motor oil, and gasoline were detected (Plates 12 and 14). Diesel fuel was detected in soil at a maximum of 1,400 mg/kg at 3.8 feet bgs and motor oil was detected at 3,800 mg/kg at the same depth. The concentration of gasoline was detected in soil at 4.72 mg/kg at 4.4 feet bgs. Groundwater was not collected.

The elevated concentrations of TPH suggest there was a surface release of fuels from the equipment room.

6.2.10 *Contaminant Releases*

The predominant chemicals detected in soil, soil gas and groundwater appears to be from chlorinated solvents. Fuel-related compounds and metals are also found in soil and groundwater. Some appear to be widespread and are probably from multiple sources, while others are probably isolated to a single source. The following summary discusses each of these areas and attempts to identify a source for each.

Chlorinated Solvents. Chlorinated solvents, predominantly TCE, are present in soil, soil gas, and groundwater beneath the 50 Series Complex (Table 6-24). The primary degradation products identified are cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride. Methylene chloride is a degradation product of carbon tetrachloride and chloroform, but also could have been used in pure form as a metal cleaner/degreaser and paint removal/stripper. Based on the number of detections of carbon tetrachloride (1) versus methylene chloride (15) in soil and groundwater, it appears that methylene chloride was used in its pure form (Table 6-24).

Table 6-24. Predominant Chlorinated VOC Detections at the 50 Series Complex

Location	Number of Detected Values /Number of Analyses		
	Soil	Soil Gas	Groundwater
TCE	52 of 73	7 of 8	13 of 14
Cis-1,2-DCE	22 of 73	6 of 8	14 of 14
Trans-1,2-DCE	4 of 73	3 of 8	8 of 14
Vinyl Chloride	0 of 73	1 of 8	7 of 14
Carbon Tetrachloride	1 of 73	0 of 8	0 of 14
Methylene Chloride	13 of 73	2 of 8	1 of 14

TCE was detected in every soil sample, except for samples collected from two borings (B055HA003 and B057AHP002); methylene chloride was the only VOC detected (less than 0.0033 mg/kg) in samples from these two borings (Plate 9). Table 6-25 summarizes the highest TCE concentrations, which were found near the parkerizing vat in Building 57A, the northern portion of Building 56, near the former forges in Building 55, and the area where the Building 65(B) Boiler Room soil was placed (Plate 9). Cis-1,2-DCE and methylene chloride was found in soil at much lower concentrations than TCE. TCE was also found in soil gas and groundwater at these locations (Plates 10 and 11).

Table 6-25. Highest TCE Concentrations in Soil, Soil Gas, and Groundwater at the 50 Series Complex

Location	Soil Concentration (mg/kg)	Soil Gas Concentration (ppbv)	Groundwater Concentration (µg/L)
Building 57A Parkerizing area	82 (B057ASB001)	140,000 (B057ASB001)	390 (B057AHP008)
Building 57 Basement area south of Firing Ranges (basement west of Building 57A)	8.7 (B057HA004)	NS	8,500 (B057HA004)
Northern portion of Building 56	6.9 (B056SB004)	NS	2,200 (B056SB003)
Former foundry area in Building 55	2.1 (B055HA002)	13 (B055SB001)	NS
Soil from the former Building 65(B) boiler room	1.5 (B065BHA003)	NS	13 (B057AHP002)
Western portion of Building 56A	0.0021 (B056AHA002)	540 (B056AHA002)	3,800 (B057AHP004)
Building 56B	0.024 (B056BHA003)	1,800 (B056BHA003)	NS

mg/kg = milligrams per kilogram
ppbv = parts per billion by volume
µg/L = micrograms per liter

Methylene chloride was detected mostly in soil at concentrations ranging from 0.0016 mg/kg to 0.0099 mg/kg. Methylene chloride was detected in soil samples located throughout the 50 Series Complex, from Building 55 to the basement area beneath Building 57 and to locations outside the complex. There is no systematic explanation for the low methylene chloride concentrations observed in soil.

Based on data collected from this investigation, chlorinated solvents are located under the 50 Series Complex and beyond to the southwest and northeast. Soil containing petroleum hydrocarbons appears in Building 57A near the deepest end of the vat, south of the vat, and in isolated locations in Building 56 and 55 (Plate 9). VOCs have been detected in groundwater that extends beyond the 50 Series Complex to the southwest and to the northeast. The parkerizing vat in Building 57A is a potential source of chlorinated solvents in groundwater. Higher TCE concentrations (2,200 µg/L) were found in Building 56, located east of Building 57A and at B057AHP004 (3,800 µg/L) and B057HA004 (8,500 µg/L), southeast of Building 57A (Plate 11).

The data indicates that the TCE is degrading, by either biotic or abiotic pathways, into cis-1,2-DCE. TCE degradation is shown by both the spatial distribution and relative concentrations of solvents observed in the samples. Cis-1,2-DCE is present proportionally at concentrations much lower than TCE concentrations. This may suggest that the TCE spill took place a relatively long time ago.

Petroleum Hydrocarbons. Diesel fuel and motor oil are other contaminants found in soil and groundwater throughout the 50 Series Complex. Diesel fuel and motor oil were detected most frequently in soil, while in gasoline and diesel fuel were detected most frequently in groundwater (Table 6-26). Plates 12 and 13 show the detected values for TPH in soil and groundwater, respectively.

Table 6-26. Petroleum Hydrocarbon Detections at the 50 Series Complex

Location	Number of Detects /Number of Analyses		
	Soil	Soil Gas	Groundwater
Gasoline	8 of 106	NA	5 of 14
Diesel fuel	55 of 106	NA	9 of 14
Motor Oil	29 of 106	NA	1 of 14
Benzene	12 of 73	1 of 8	3 of 14
MTBE	0 of 73	2 of 8	4 of 14

Motor oil is commonly detected in soil samples where diesel fuel is also detected. The highest concentrations of diesel fuel and motor oil correlate to impacted soils beneath Building 56A, Building 55 and within the utility tunnel (Plate 12).

Diesel fuel was also commonly detected in groundwater. The second most common petroleum hydrocarbon detected in groundwater was gasoline. Motor oil also was detected in groundwater; however, the concentrations of motor oil in groundwater were much less than diesel and gasoline (Table 6-26).

There are six areas where petroleum hydrocarbons are detected in groundwater at the 50 Series Complex (Plate 13). These areas are located at Building 53, Building 103, Building 120, Building 154, south of Building 55 and north of the 50 Series Complex. These areas were identified based on data from this investigation and other investigations at these locations.

- Three separate petroleum hydrocarbons affected areas are located at Building 53, Building 103 and Building 154. The USTs from these buildings were removed in March 2002. The USTs were not intact and appeared to have leaked fuel. These USTs are the likely sources for the TPH impacted groundwater at these locations.

- Gasoline and diesel fuel were detected at concentrations of 2,300 µg/L and 380 µg/L, respectively in groundwater sample B057AHP002, located south of Building 55. Equipment used in Building 55 used fuels. These fuels may have been stored or spilled on the ground outside the building. Gasoline and diesel fuel have also been detected in the groundwater sample collected from boring B057AHP003. There were now other groundwater samples collected between B057AHP002 and B057AHP003 to confirm whether these two releases are connected.

- Elevated concentrations of gasoline (51,000 µg/L) and diesel fuel (1,300 µg/L) were detected in the groundwater sample collected from B057AHP003, north of the 50 Series Complex. The source of the TPH in groundwater in this area has not been identified. This release extends north to Building 73. Gasoline and diesel were also detected in sample B053TR001, located in this area, at concentrations of 1,300 µg/L and 160 µg/L, respectively.

- Lastly, motor oil and diesel were detected in a groundwater sample collected near Building 120. USTs are suspected in this area, although no conclusive geophysical evidence was obtained. The TPH detected in groundwater at this location could substantiate the presence of a UST in the area or another unknown source.

A seventh TPH groundwater plume is located beneath Building 57A with diesel fuel concentration of 110 µg/L. MTBE, a fuel oxygenate used since the early 1980s, was detected in groundwater samples B053SB002, B057AHP005, and B057AHP008 at concentrations of 0.59 µg/L, 0.52 µg/L and 17 µg/L, respectively. A water sample from the Building 57A standpipe contained MTBE at 4.7 µg/L. No additional fuel oxygenates were detected in the water samples. MTBE was first used as a fuel additive in the 1970s, after Arsenal closure. Therefore, businesses occupying buildings at the complex used USTs and/or ASTs the Army installed for their operations. The USTs then leaked gasoline or diesel fuel into the subsurface contributing MTBE to groundwater contamination.

Metals. Typical metals associated with former activities at the 50 Series Complex include antimony, arsenic, copper, and lead. Antimony, arsenic and the other metals have been detected in soil samples collected throughout the site, at relatively similar concentrations; these concentrations may be indicative of ambient concentrations. Elevated concentrations of copper and lead were found in soil samples from beneath the basement, near the former foundry in Building 55, near the parkerizing vat in Building 56 and the boiler room at former Building 65(B) (Plate 14). Lead was also found in soil at elevated concentrations in the western portion of Building 56A, which may be associated with the former USTs at Building 154.

Table 6-2. Detected Analytes in Soil*
VOCs (mg/kg), 50 Series Complex

Location ID	Sample Date	Depth (feet)	Soil Code	1,1,3-TRIMETHYLCYCLOHEXANE	1,2,3,4-TETRAMETHYLBENZENE	1,2,3-TRICHLOROBENZENE	1,2,4-TRICHLOROBENZENE	1,2,4-TRIMETHYLBENZENE	1,3,5-TRIMETHYLBENZENE	1,4-DICHLOROBENZENE	1-HEXADECEN-3-YNE, 2-METHYL	4-ETHYL-2,2,6-TRIMETHYLCYCLOHEXANE
						< 0.001	< 0.001	0.0012 J	< 0.0003	< 0.0003		
					0.87 NJ	< 0.014	< 0.023	< 0.021	0.055 J	< 0.019		
						< 0.0002 UJ	< 0.0004 UJ	< 0.0004 UJ	< 0.0004 UJ	< 0.0003 UJ		
						< 0.001 UJ	< 0.001 UJ	< 0.0006 UJ	< 0.0003 UJ	< 0.0003 UJ		
						< 0.04	< 0.04	< 0.02	< 0.01	< 0.01		
						< 0.0008	< 0.0008	< 0.0005	< 0.0003	< 0.0003		
						< 0.0009	< 0.0008	< 0.0005	< 0.0003	< 0.0003	0.0056 NJ	
								< 0.027 UJ	< 0.014 UJ	< 0.015 UJ		
						< 0.0009 UJ	< 0.0009 UJ	< 0.0005 UJ	< 0.0003 UJ	< 0.0003 UJ		
						< 0.001	< 0.001	< 0.0006	< 0.0003	< 0.0003		
						< 0.001 UJ	< 0.0009 UJ	< 0.0006 UJ	< 0.0003 UJ	< 0.0003 UJ		
				0.037 NJ		< 0.0011 UJ	< 0.0011 UJ	< 0.0006 UJ	< 0.0004 UJ	< 0.0004 UJ		0.062 NJ
						< 0.001	< 0.0009 UJ	< 0.0006	< 0.0003	< 0.0003		
						< 0.001	< 0.0009 UJ	< 0.0006	< 0.0003	< 0.0003		
						0.0014 J	< 0.0009 UJ	< 0.0006	< 0.0003	< 0.0003		
						< 0.0018	< 0.0015	< 0.0009	< 0.0005	< 0.0005		
						< 0.05	< 0.04	< 0.02	< 0.01	< 0.01		
						< 0.0011	< 0.0011	< 0.0007	< 0.0004	< 0.0004		
						< 0.001	< 0.001	< 0.0006	< 0.0003	< 0.0003		
						< 0.0009 UJ	< 0.0008	< 0.0005	< 0.0003	< 0.0003		
						< 0.0009	< 0.0009	< 0.0005	< 0.0003	< 0.0003		
						< 0.0011	< 0.001	< 0.0006	< 0.0003	< 0.0004		
						< 0.0009	< 0.0008	< 0.0005	< 0.0003	< 0.0003		
						< 0.001	< 0.001 UJ	< 0.0006	< 0.0003	< 0.0003		
						< 0.0008 UJ	< 0.0008 UJ	< 0.0005	< 0.0003	< 0.0003		
						< 0.0009	< 0.0009	< 0.0005	< 0.0003	< 0.0003		
						< 0.001	< 0.001	0.0052 J	< 0.0003	< 0.0003		
						< 0.001 UJ	< 0.001	< 0.0006	< 0.0003	< 0.0003		
						< 0.0011 UJ	< 0.0011 UJ	< 0.0007 UJ	< 0.0004 UJ	< 0.0004 UJ		
						< 0.001	< 0.001	< 0.0006	< 0.0003	< 0.0003		
						< 0.001	< 0.001	< 0.0006	< 0.0003	< 0.0003		
						< 0.0011	< 0.001	< 0.0006	< 0.0003	< 0.0004		
						< 0.0009 UJ	< 0.0009 UJ	< 0.0005 UJ	< 0.0003 UJ	< 0.0003 UJ		
						< 0.001 UJ	< 0.0009 UJ	< 0.0006 UJ	< 0.0003 UJ	< 0.0003 UJ		
						< 0.0013	< 0.0012	< 0.0007	< 0.0004	< 0.0004		
						< 0.0013	< 0.0012	< 0.0007	< 0.0004	< 0.0004		
						< 0.0013	< 0.0013	< 0.0008	< 0.0004	< 0.0004		
						< 0.0012	< 0.0012	< 0.0007	< 0.0004	< 0.0004		
						< 0.0012	< 0.0012	< 0.0007	< 0.0004	< 0.0004		
						< 0.048	< 0.047	< 0.028	< 0.015	< 0.016		
						< 0.0013	< 0.0013	< 0.0008	< 0.0004	< 0.0004		
						< 0.0011	< 0.001	< 0.0006	< 0.0003	< 0.0004		
						< 0.001 UJ	< 0.0009 UJ	< 0.0006 UJ	< 0.0003 UJ	< 0.0003 UJ		
					0.01 NJ	< 0.0011	< 0.0011	< 0.0008	< 0.0004	< 0.0004		
						< 0.0009 UJ	< 0.0009 UJ	< 0.0005 UJ	< 0.0003 UJ	< 0.0003 UJ		
						< 0.001	< 0.001	< 0.0006	< 0.0003	< 0.0003		
						< 0.0009	< 0.0009	< 0.0005	< 0.0003	< 0.0003		
						< 0.001	< 0.001	< 0.0006	< 0.0003	< 0.0003		
						< 0.001	< 0.0009	< 0.0006	< 0.0003	< 0.0003		
				2.5 NJ		< 0.055	< 0.053	0.22 J	0.28 J	< 0.018		
						< 0.001 UJ	< 0.001 UJ	< 0.0006 UJ	< 0.0003 UJ	< 0.0003 UJ		
						< 0.0009	< 0.0009	< 0.0005	< 0.0003	< 0.0003		
						< 0.04	< 0.04	< 0.02	< 0.01	< 0.01		
				0.019 NJ		< 0.0009	< 0.0009	< 0.0005	< 0.0003	< 0.0003		
						< 0.0011	< 0.0011	< 0.0006	< 0.0003	< 0.0004		
						< 0.055	< 0.053	< 0.032	< 0.017	< 0.018		
						< 0.25	< 0.24	< 0.14	< 0.078	< 0.083		
						< 0.26	< 0.25	< 0.15	< 0.081	< 0.086		
						< 0.001	< 0.001	< 0.0006	< 0.0003	< 0.0003		
				0.031 NJ		< 0.0012 UJ	< 0.0012 UJ	< 0.0007	< 0.0004	< 0.0004		
						< 0.0009	< 0.0009	< 0.0005	< 0.0003	< 0.0003		
						< 0.001 UJ	< 0.0009 UJ	< 0.0006 UJ	< 0.0003 UJ	< 0.0003 UJ		
						< 0.0013	< 0.0012	< 0.0007	< 0.0004	< 0.0004		
						< 0.0011 UJ	< 0.001 UJ	< 0.0006 UJ	< 0.0003 UJ	< 0.0004 UJ		
						< 0.05	< 0.04	0.032 J	< 0.01	< 0.01		
						< 0.001 UJ	< 0.0009 UJ	< 0.0006 UJ	< 0.0003 UJ	< 0.0003 UJ		
						0.0035 J	0.0026 J	0.0013 J	< 0.0003 UJ	0.002 J		
						< 0.001	< 0.001	< 0.0006	< 0.0003	< 0.0003		
						< 0.0014	< 0.0013	< 0.0008	< 0.0004	< 0.0005		
Number of Detects:				4	2	2	1	5	2	1	1	1
Total Number of Analyses:				75	75	75	75	75	75	75	75	75
Minimum Concentration:				0.019	0.01	0.0014	0.0026	0.0012	0.055	0.002	0.0059	0.062
Maximum Concentration:				2.5	0.87	0.0035	0.0026	0.22	0.28	0.002	0.0059	0.062
Mean Detected Concentration:				0.647	0.44	0.0025	0.0026	0.0519	0.168	0.002	0.0059	0.062

QUALIFIER LEGEND:

J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

NJ — The analyte identification is presumptive. Reported value is an estimated concentration.

UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

* All detected sample results associated with blank contamination have been qualified as non-detect with an estimated detection limit (UJ) where the sample results was less than 5 times the associated blank results (10 times for common laboratory contaminants). Common volatile laboratory contaminants are methylene chloride, acetone, and 2-butanone.

Table 6-2. Detected Analytes in Soil[a]
VOCs (mg/kg), 50 Series Complex
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Location ID	Sample Date	Depth (feet)	Soil Code	1H-INDENE,2,3-DIHYDRO-1,2-DIMETHYL	2,3-DIHYDRO-4-METHYL-1H-INDENE	2,3-DIHYDRO-1,2-DIMETHYL-1H-INDENE	2,3-DIHYDRO-1,3-DIMETHYL-1H-INDENE	2-ETHYLTOLUENE	2-HEXANONE	2-METHYLHEPTANE	4-HYDROXYBENZYL ALCOHOL	4-METHYL-DECANE	5-UNDECENE
									< 0.0013				
						0.54 NJ	0.87 NJ	0.49	< 0.068 UJ				
									< 0.0012 UJ				
									< 0.0013 UJ				
									< 0.06				
									< 0.001				
									< 0.0011				
									< 0.056				
									< 0.0011 UJ				
									< 0.0013				
									< 0.0012 UJ				
									< 0.0014				
									< 0.0012				
									< 0.0012				
									< 0.0012				
									< 0.0019				
									< 0.06				0.51 NJ
									< 0.0014				
									< 0.0012				
									< 0.0011				
									< 0.0011		0.0058 NJ		
									< 0.0013				
									< 0.001		0.0074 NJ		
									< 0.0012				
									< 0.001				
									< 0.0011				
									< 0.0013				
									< 0.0012				
									< 0.0014				
									< 0.0012				
									< 0.0012				
									< 0.0013				
									0.019 J				
									< 0.0012 UJ				
									< 0.0015				
									< 0.0015				
									< 0.0016				
									< 0.0015				
									< 0.0015				
									< 0.056				
									< 0.0016				
									< 0.0013				
									< 0.0012 UJ				
				0.011 NJ	0.017 NJ			0.012 NJ	< 0.0014				
									< 0.0011 UJ				
									< 0.0012				
									< 0.0011				
									< 0.0012				
									< 0.0012				
									< 0.067	4 NJ		1.8 NJ	
									< 0.0012 UJ				
									< 0.0011				
									< 0.05				
									< 0.0011				
									< 0.0013				
									< 0.067				
									< 0.31				
									< 0.32				
									< 0.0013				
									< 0.0015				
									< 0.0011				
									< 0.0012 UJ				
									< 0.0016				
									< 0.0013 UJ				
									< 0.06				
									< 0.0012 UJ				
									< 0.0012				
									< 0.0012				
									< 0.0017				
Number of Detects:				1	1	1	1	2	1	1	2	1	1
Total Number of Analyses:				75	75	75	75	75	75	75	75	75	75
Minimum Concentration:				0.011	0.017	0.54	0.87	0.012	0.019	4	0.0058	1.8	0.51
Maximum Concentration:				0.011	0.017	0.54	0.87	0.49	0.019	4	0.0074	1.8	0.51
Mean Detected Concentration:				0.011	0.017	0.54	0.87	0.251	0.019	4	0.0066	1.8	0.51

Table 6-2. Detected Analytes in Soil*
VOCs (mg/kg), 50 Series Complex
(Page 3 of 6)

Location ID	Sample Date	Depth (feet)	Soil Code	ACETONE	BENZENE	BROMOBENZENE	BROMODICHLOROMETHANE	BUTANE, 1-1 METHYLTHIO	CARBON DISULFIDE	CARBON TETRACHLORIDE	CHLOROFORM	CIS,CIS,CIS-1,2,3-TRIMETHYLCYCLOPENTANE	
				< 0.0027	< 0.0002	< 0.0006	< 0.0002		< 0.0001	< 0.0003	< 0.0005		
				< 0.22	< 0.013	< 0.043	< 0.014		< 0.0068	< 0.043	< 0.023		
				0.052 J	< 0.0002 UJ	< 0.0006 UJ	< 0.0002 UJ		< 0.0001 UJ	< 0.0006 UJ	< 0.0004 UJ		
				< 0.0027 UJ	< 0.0002 UJ	< 0.0006 UJ	< 0.0002 UJ		< 0.0001 UJ	< 0.0003 UJ	< 0.0004 UJ		
				< 0.13	< 0.0099	< 0.02	< 0.01		< 0.0082	< 0.01	< 0.02		
				< 0.0021	< 0.0002	< 0.0005	< 0.0002		< 0.0001	< 0.0009	< 0.0004		
				< 0.0023	< 0.0002	< 0.0005	< 0.0002		< 0.0001	< 0.0003	< 0.0004		
				< 0.12	< 0.0093	< 0.027 UJ	< 0.011		< 0.0058	< 0.015	< 0.02		
				< 0.0023 UJ	< 0.0002 UJ	< 0.0005 UJ	< 0.0002 UJ		< 0.0001 UJ	< 0.0003 UJ	< 0.0004 UJ		
				< 0.0027	< 0.0002	< 0.0006	< 0.0002		< 0.0001	< 0.0003	< 0.0005		
				< 0.081 UJ	< 0.0002	< 0.0006 UJ	< 0.0002		< 0.0001	< 0.0003	< 0.0004		
				< 0.0029	< 0.0002	0.0035 J	< 0.0003		0.0096 J	0.0018 J	< 0.0005		
				< 0.0025	< 0.0002	< 0.0006	< 0.0002		0.0077	< 0.0003	< 0.0004		
				< 0.082 UJ	0.0016 J	< 0.0006	< 0.0002		0.0026 J	< 0.0003	< 0.0004		
				< 0.0025	0.0012 J	< 0.0006	< 0.0002		< 0.0001	< 0.0003	< 0.0004		
				< 0.0041 UJ	< 0.0003	< 0.0009	< 0.0004		< 0.0002	< 0.0005	< 0.0007		
				< 0.13 UJ	< 0.01	< 0.03	< 0.01		< 0.0063	< 0.01	< 0.02		
				< 0.0029 UJ	< 0.0002	< 0.0007	< 0.0003		< 0.0001	< 0.0004	< 0.0005		
				< 0.0026 UJ	0.0015 J	< 0.0006	< 0.0002		< 0.0001	< 0.0003	< 0.0004		
				0.012 J	< 0.0002	< 0.0005	< 0.0002		< 0.0001	< 0.0003	< 0.0004		
				< 0.15 UJ	< 0.0002	< 0.0005	< 0.0002		< 0.0001	< 0.0003	< 0.0004		
				< 0.0026	< 0.0002	< 0.0006	< 0.0003		< 0.0001	< 0.0004	< 0.0005		
				< 0.14 UJ	< 0.0002	< 0.0005	< 0.0002		< 0.0001	< 0.0003	< 0.0004		
				< 0.0026	< 0.0002	< 0.0006	< 0.0002		< 0.0001	< 0.0003	< 0.0004		
				< 0.057 UJ	< 0.0002	< 0.0005	< 0.0002		< 0.0001	< 0.0003	< 0.0004		
				0.022	< 0.0002	< 0.0005	< 0.0002		< 0.0001	< 0.0003	< 0.0004		
				< 0.23 UJ	0.0029 J	< 0.0006	< 0.0002		< 0.0001	< 0.0003	< 0.0005		
				0.037 J	0.0039 J	< 0.0008	< 0.0002		< 0.0001	< 0.0003	< 0.0004		
				0.18	0.0018 J	< 0.0007 UJ	< 0.0003		< 0.0001	< 0.0004	< 0.0005		
				0.045	< 0.0002	< 0.0006	< 0.0002		< 0.0001	< 0.0003	< 0.0004		
				0.049	< 0.0002	< 0.0006	< 0.0002		< 0.0001	< 0.0003	< 0.0004		
				0.076 J	< 0.0002 UJ	< 0.0006	< 0.0003 UJ		< 0.0001 UJ	< 0.0003 UJ	< 0.0005 UJ		
				0.38 J	< 0.0002 UJ	< 0.0005 UJ	< 0.0002 UJ		< 0.0001 UJ	< 0.0003 UJ	< 0.0004 UJ		
				0.096 J	0.0037 J	< 0.0006 UJ	< 0.0002 UJ		< 0.0001 UJ	< 0.0003 UJ	< 0.0004 UJ		
				0.026 J	< 0.0003	< 0.0007	0.0019 J		< 0.0002	< 0.0004	0.0072		
				0.027 J	< 0.0003	< 0.0008	< 0.0003		< 0.0002	< 0.0004	< 0.0006		
				0.023 J	< 0.0003	< 0.0008	< 0.0003		< 0.0002	< 0.0004	0.0075		
				0.06 J	< 0.0002	< 0.0007	< 0.0003		< 0.0002	< 0.0004	0.0047 J		
				0.044	< 0.0003	< 0.0007	< 0.0003		< 0.0002	< 0.0004	0.0055 J		
				< 0.13	< 0.0098	< 0.029	< 0.011		< 0.0061	< 0.016	< 0.021		
				< 0.0035	< 0.0003	< 0.0008	< 0.0003		< 0.0002	< 0.0004	< 0.0006		
				0.13	< 0.0002	< 0.0006	< 0.0003		< 0.0001	< 0.0003	0.0012 J		
				< 0.0025 UJ	< 0.0002 UJ	< 0.0006 UJ	< 0.0002 UJ		< 0.0001 UJ	< 0.0003 UJ	< 0.0004 UJ		
				0.024 J	0.003 J	< 0.0007	< 0.0003		< 0.0001	< 0.0004	< 0.0005		
				0.087 J	< 0.0002 UJ	< 0.0006 UJ	< 0.0002 UJ		< 0.0001 UJ	< 0.0003 UJ	< 0.0004 UJ		
				0.049	< 0.0002	< 0.0006	< 0.0002		< 0.0001	< 0.0003	< 0.0004		
				0.056	< 0.0002	< 0.0005	< 0.0002		< 0.0001	< 0.0003	< 0.0004		
				0.01 J	< 0.0002	< 0.0006	< 0.0002		< 0.0001	< 0.0003	< 0.0004 UJ		
				< 0.0026	< 0.0002	< 0.0006	< 0.0002		< 0.0001	< 0.0003	< 0.0004 UJ		
				< 0.14	< 0.011	< 0.032	< 0.013		< 0.0069	< 0.018	< 0.024		1.3 NJ
				0.055 J	< 0.0002 UJ	< 0.0006 UJ	< 0.0002 UJ		< 0.0001 UJ	< 0.0003 UJ	< 0.0004 UJ		
				< 0.0024	< 0.0002	< 0.0006	< 0.0002		< 0.0001	< 0.0003	< 0.0004		
				< 0.12	< 0.0097	< 0.02	< 0.01		< 0.006	< 0.01	< 0.02		
				0.014 J	0.0011 J	< 0.0006	< 0.0002		< 0.0001	< 0.0003	< 0.0004 UJ		
				0.029	< 0.0002	< 0.0007	< 0.0003		< 0.0001	< 0.0004	< 0.0005		
				< 0.14	< 0.011	< 0.032	< 0.013		< 0.0069	< 0.016	< 0.024		
				< 0.85	< 0.051	< 0.15	< 0.058		< 0.032	< 0.081	< 0.11		
				< 0.88	< 0.053	< 0.15	< 0.06		< 0.033	< 0.084	< 0.11		
				< 0.15 UJ	< 0.0002	< 0.0006	< 0.0002		< 0.0001	< 0.0003	< 0.0004		
				< 0.15	< 0.0002	< 0.0007	< 0.0003		< 0.0002	< 0.0004	< 0.0005		
				< 0.27	0.0054	< 0.0005	< 0.0002		< 0.0001	< 0.0003	0.0036 J		
				< 0.13	0.0061 J	< 0.0006 UJ	< 0.0002 UJ		< 0.0001 UJ	< 0.0003 UJ	< 0.0004 UJ		
				0.12	0.015	< 0.0008	< 0.0003		< 0.0002	< 0.0004	0.0028 J		
				0.075 J	< 0.0002 UJ	< 0.0006 UJ	< 0.0003 UJ		< 0.0001 UJ	< 0.0004 UJ	< 0.0005 UJ		
				< 0.13 UJ	< 0.01	< 0.02	< 0.01		< 0.0062	< 0.01	< 0.02		
				< 0.0025 UJ	< 0.0002 UJ	< 0.0006 UJ	< 0.0002 UJ	0.0054 NJ	< 0.0001 UJ	< 0.0003 UJ	< 0.0004 UJ		
				< 0.0026 UJ	< 0.0002	< 0.0006 UJ	< 0.0002		< 0.0001	< 0.0003	< 0.0004		
				< 0.0026 UJ	< 0.0002	< 0.0006	< 0.0002		< 0.0001	< 0.0003	< 0.0004		
				0.21	< 0.0003	< 0.0008	< 0.0003		< 0.0002	< 0.0005	< 0.0006		
Number of Detects:				27	12	1	1	1	3	1	7	1	
Total Number of Analyses:				75	75	75	75	75	75	75	75	75	
Minimum Concentration:				0.01	0.0011	0.0035	0.0019	0.0054	0.0026	0.0018	0.0012	1.3	
Maximum Concentration:				0.38	0.015	0.0035	0.0019	0.0054	0.0096	0.0018	0.0075	1.3	
Mean Detected Concentration:				0.07	0.0039	0.0035	0.0019	0.0054	0.0067	0.0018	0.0046	1.3	

Table 6-2. Detected Analytes in Soil*
VOCs (mg/kg), 50 Series Complex
(Page 4 of 6)

Location ID	Sample Date	Depth (feet)	Soil Code	cis-1,2-DICHLOROETHENE	ETHYLBENZENE	ETHYLCYCLOHEXANE	HEXACHLOROBUTADIENE	HEXANE[TR]	INDANE	ISOPROPYLBENZENE	m,p-XYLENE	METHYL ETHYL KETONE	METHYL ISOBUTYL KETONE
				< 0.0002	0.0017 J		< 0.0003			< 0.0003	0.0013 J	< 0.0019	< 0.0011
				< 0.016	0.34		< 0.021			0.89	0.079 J	< 0.28	< 0.062
				0.001 J	0.0024 J		< 0.0004 UJ			< 0.0003 UJ	0.0008 J	< 0.0048 UJ	< 0.0011 UJ
				< 0.0002 UJ	< 0.0002 UJ		< 0.0003 UJ			< 0.0002 UJ	< 0.0004 UJ	< 0.0019 UJ	< 0.0011 UJ
				< 0.01	< 0.0089		< 0.01			< 0.01	< 0.01	< 0.09	< 0.05
				< 0.0002	< 0.0002		< 0.0003			< 0.0002	< 0.0003	< 0.0015	< 0.0009
				< 0.0002	< 0.0002		< 0.0003			< 0.0002	< 0.0003	< 0.0016	< 0.001
				< 0.0084	< 0.0083		< 0.014 UJ			< 0.011 UJ	< 0.018	< 0.084	< 0.051
				< 0.0002 UJ	< 0.0002 UJ		< 0.0003 UJ			< 0.0002 UJ	< 0.0004 UJ	< 0.0016 UJ	< 0.001 UJ
				< 0.0002	< 0.0002		< 0.0003			< 0.0003	< 0.0004	< 0.0019	< 0.0011
				< 0.0002	< 0.0002 UJ		< 0.0003 UJ			< 0.0002 UJ	< 0.0004 UJ	< 0.0018	< 0.0011
				0.15 J	< 0.0002		< 0.0004 UJ			< 0.0003 UJ	< 0.0004	< 0.002	< 0.0012
				< 0.0002	0.0015 J		< 0.0003			< 0.0002	< 0.0004	< 0.0017	< 0.001
				< 0.0002	< 0.0002		< 0.0003			< 0.0002	< 0.0004	0.02 J	< 0.001
				< 0.0002	0.0062		< 0.0003			< 0.0002	< 0.0004	< 0.0017	< 0.0011
				0.0033 J	< 0.0003		< 0.0005			< 0.0004	< 0.0006	< 0.0028	< 0.0017
				< 0.01	< 0.0091		< 0.01			< 0.01	< 0.02	< 0.09	< 0.05
				0.018	0.0012 J		< 0.0004			< 0.0003	< 0.0004	< 0.0021	< 0.0012
				0.0013 J	0.0063		< 0.0003			< 0.0002	< 0.0004	< 0.0019	< 0.0011
				< 0.0002	0.0029 J		< 0.0003			< 0.0002	< 0.0003	< 0.0016	< 0.001
				< 0.0002	< 0.0002		< 0.0003			< 0.0002	< 0.0004	< 0.0016	< 0.001
				< 0.0002	< 0.0002		< 0.0003			< 0.0003	< 0.0004	< 0.002	< 0.0012
				< 0.0002	< 0.0002		< 0.0003			< 0.0002	< 0.0003	< 0.0015	< 0.0009
				< 0.0002	< 0.0002		< 0.0003			< 0.0002	< 0.0004	< 0.0019	< 0.0011
				< 0.0002	< 0.0002		< 0.0003			< 0.0002	< 0.0003	< 0.0015	< 0.0009
				< 0.0002	< 0.0002		< 0.0003			< 0.0002	< 0.0004	< 0.0017	< 0.001
				< 0.0002	0.002 J		< 0.0003			< 0.0002	0.003 J	< 0.0019	< 0.0011
				< 0.0002	< 0.0002		< 0.0003			< 0.0002	< 0.0004	< 0.0019	< 0.0011
				< 0.0002	< 0.0002		< 0.0004 UJ			< 0.0003 UJ	< 0.0004	0.026	< 0.0013
				0.0043 J	< 0.0002		< 0.0003			< 0.0002	< 0.0004	< 0.0018	< 0.0011
				< 0.0002	< 0.0002		< 0.0003			< 0.0002	< 0.0004	< 0.0018	< 0.0011
				0.029 J	< 0.0002		< 0.0003			< 0.0003	< 0.0004	< 0.0019 UJ	< 0.0012
				< 0.0002 UJ	< 0.0002 UJ		< 0.0003 UJ			< 0.0002 UJ	< 0.0004 UJ	0.12 J	< 0.001 UJ
				< 0.0002 UJ	0.016 J		< 0.0003 UJ			< 0.0002 UJ	< 0.0004 UJ	< 0.0017 UJ	< 0.001 UJ
				0.0062	< 0.0002		< 0.0004			< 0.0003	< 0.0005	< 0.0023	< 0.0014
				0.0076	< 0.0002		< 0.0004			< 0.0003	< 0.0005	< 0.0023	< 0.0014
				0.0073 J	< 0.0002		< 0.0004			< 0.0003	< 0.0005	< 0.0024	< 0.0015
				0.0043 J	< 0.0002		< 0.0004			< 0.0003	< 0.0005	< 0.0022	< 0.0013
				0.01	< 0.0002		< 0.0004			< 0.0003	< 0.0005	< 0.0022	< 0.0014
				< 0.0069	< 0.0068		< 0.015			< 0.011	< 0.019	< 0.089	< 0.054
				0.002 J	< 0.0002		< 0.0004			< 0.0003	< 0.0005	< 0.0024	0.11
				0.016	< 0.0002		< 0.0003			< 0.0003	< 0.0004	< 0.002	< 0.0012
				< 0.0002 UJ	< 0.0002 UJ		< 0.0003 UJ			< 0.0002 UJ	< 0.0004 UJ	< 0.0017 UJ	< 0.0011 UJ
				0.0079	0.0031 J		< 0.0004		0.36 NJ	0.0029 J	0.0021 J	< 0.002	< 0.0012
				< 0.0002 UJ	< 0.0002 UJ		< 0.0003 UJ			< 0.0002 UJ	< 0.0004 UJ	< 0.0017 UJ	< 0.001 UJ
				< 0.0002	< 0.0002		< 0.0003			< 0.0002	< 0.0004	< 0.0018	< 0.0011
				< 0.0002	< 0.0002		< 0.0003			< 0.0002	< 0.0004	< 0.0017	< 0.001
				< 0.0002 UJ	< 0.0002		< 0.0003			< 0.0002	< 0.0004	< 0.0018	< 0.0011
				0.0043 J	< 0.0002		< 0.0003			< 0.0002	< 0.0004	< 0.0018	< 0.0011
				< 0.011	0.33	0.92 NJ	< 0.017	1.2 NJ		0.2 J	< 0.021	< 0.1	< 0.061
				< 0.0002 UJ	< 0.0002 UJ		< 0.0003 UJ			< 0.0002 UJ	< 0.0004 UJ	< 0.0018 UJ	< 0.0011 UJ
				< 0.0002	< 0.0002		< 0.0003			< 0.0002	< 0.0004	< 0.0017	< 0.001
				0.13 J	< 0.0087		< 0.01			< 0.01	< 0.01	< 0.08	< 0.05
				0.011 J	< 0.0002		< 0.0003			< 0.0002	< 0.0004	< 0.0017	< 0.001
				< 0.0002	< 0.0002		< 0.0003			< 0.0003	< 0.0004	< 0.002	< 0.0012
				< 0.011	< 0.0099		< 0.017			< 0.013	< 0.021	< 0.1	< 0.061
				5.2	< 0.045		< 0.078			< 0.059	< 0.096	< 0.46	< 0.28
				< 0.053	< 0.047		< 0.081			< 0.062	< 0.1	< 0.48	< 0.29
				0.0055 J	< 0.0002		< 0.0003			< 0.0002	< 0.0004	< 0.0019	< 0.0011
				< 0.0003	< 0.0002		< 0.0004			< 0.0003	< 0.0005	< 0.0022	< 0.0013
				0.86	0.001 J		< 0.0003			< 0.0002	0.0017 J	< 0.0017	< 0.001
				< 0.0002 UJ	< 0.0002 UJ		< 0.0003 UJ			< 0.0002 UJ	0.0038 J	< 0.0018 UJ	< 0.0011 UJ
				0.13	< 0.0002		< 0.0004			< 0.0003	0.0022 J	< 0.0024	< 0.0014
				0.026 J	< 0.0002 UJ		< 0.0003 UJ			< 0.0003 UJ	< 0.0004 UJ	< 0.002 UJ	< 0.0012 UJ
				< 0.01	< 0.0089		< 0.01			< 0.01	0.044 J	< 0.09	< 0.05
				< 0.0002 UJ	< 0.0002 UJ		< 0.0003 UJ			< 0.0002 UJ	< 0.0004 UJ	< 0.0018 UJ	< 0.0011 UJ
				< 0.0002	< 0.0002		0.0018 J			< 0.0002 UJ	< 0.0004	< 0.0018	< 0.0011
				< 0.0002	0.0012 J		< 0.0003			< 0.0002	< 0.0004	< 0.0018	< 0.0011
				< 0.0003	< 0.0003		< 0.0004			< 0.0003	< 0.0006	< 0.0026	< 0.0015

Number of Detects:	23	14	1	1	1	1	3	9	3	1
Total Number of Analyses:	75	75	75	75	75	75	75	75	75	75
Minimum Concentration:	0.001	0.001	0.92	0.0018	1.2	0.36	0.0029	0.0008	0.02	0.11
Maximum Concentration:	5.2	0.34	0.92	0.0018	1.2	0.36	0.89	0.079	0.12	0.11
Mean Detected Concentration:	0.280	0.051	0.92	0.0018	1.2	0.36	0.3643	0.0153	0.06	0.11

Table 6-2. Detected Analytes in Soil*
VOCs (mg/kg), 50 Series Complex
(Page 5 of 6)

Location ID	Sample Date	Depth (feet)	Soil Code	METHYLCYCLOHEXANE	METHYLCYCLOPENTANE	METHYLENE CHLORIDE	NAPHTHALENE	n-BUTYLBENZENE	N-DECANE(C10)	N-HEPTANE (C7)	N-NONANE(C9)	n-PROPYLBENZENE
						< 0.0011 UJ	< 0.0015 UJ	< 0.0011				< 0.0004
				2 NJ		< 0.022	0.17 J	0.97				3.2
						0.0027 J	< 0.0004 UJ	< 0.0004 UJ				< 0.0004 UJ
						< 0.0011 UJ	< 0.0015 UJ	< 0.0011 UJ				< 0.0003 UJ
						< 0.05 UJ	< 0.07 UJ	< 0.05				< 0.01
						0.0016 J	< 0.0012 UJ	< 0.0009				< 0.0009
						0.003 J	< 0.0013 UJ	< 0.0009				< 0.0003
						< 0.051		< 0.048 UJ				< 0.015 UJ
						0.0093 J	< 0.0013 UJ	< 0.0009 UJ				< 0.0003 UJ
						< 0.0011 UJ	< 0.0015	< 0.0011				< 0.0004
						< 0.0075 UJ	< 0.0014 UJ	< 0.001 UJ				< 0.0003 UJ
						0.0036 J	< 0.0016 UJ	< 0.0012 UJ				< 0.0004 UJ
						< 0.001 UJ	< 0.0014 UJ	< 0.001				< 0.0003
						< 0.0072 UJ	< 0.0014 UJ	< 0.001				< 0.0003
						< 0.008 UJ		< 0.001				< 0.0003
						< 0.003 UJ	< 0.0023 UJ	< 0.0016				< 0.0005
						< 0.05 UJ	< 0.07 UJ	< 0.05				< 0.01
						< 0.0012 UJ	< 0.0016 UJ	< 0.0012				< 0.0004
						< 0.0011 UJ	< 0.0015 UJ	< 0.0011				< 0.0003
						< 0.001 UJ	< 0.0013 UJ	< 0.0009				< 0.0003
						< 0.0035 UJ	< 0.0013	< 0.0009				< 0.0003
						< 0.0012 UJ	< 0.0016 UJ	< 0.0011				< 0.0004
						< 0.0033 UJ	< 0.0012	< 0.0009				< 0.0003
						< 0.026 UJ	< 0.0015 UJ	< 0.0011				< 0.0003
						< 0.003 UJ	< 0.0012 UJ	< 0.0009				< 0.0003
						< 0.023 UJ	< 0.0013 UJ	< 0.001				< 0.0003
						< 0.0011 UJ	< 0.0015	< 0.0011				< 0.0003
						< 0.0068 UJ	< 0.0015 UJ	< 0.0011				< 0.0003
						< 0.021 UJ	< 0.0017 UJ	< 0.0012 UJ				< 0.0004 UJ
						< 0.0039 UJ	< 0.0014 UJ	< 0.001				< 0.0003
						< 0.0078 UJ	< 0.0015 UJ	< 0.001				< 0.0003
						< 0.007 UJ	< 0.0016 UJ	< 0.0011				< 0.0004
						< 0.001 UJ	< 0.0013 UJ	< 0.001 UJ				< 0.0003 UJ
						< 0.001 UJ	< 0.0014 UJ	< 0.001 UJ				< 0.0003 UJ
						< 0.0014 UJ	< 0.0018	< 0.0013				< 0.0004
						< 0.0014 UJ	< 0.0018 UJ	< 0.0013				< 0.0004
						< 0.0015 UJ	< 0.0019 UJ	< 0.0014				< 0.0004
						< 0.0013 UJ	< 0.0018	< 0.0013				< 0.0004
						< 0.0014 UJ	< 0.0018	< 0.0013				< 0.0004
						< 0.053	< 0.071	< 0.05				< 0.016
						< 0.0015 UJ	< 0.0019 UJ	< 0.0014				< 0.0004
						0.0049 J	< 0.0016 UJ	< 0.0011				< 0.0004
						< 0.001 UJ	< 0.0014 UJ	< 0.001 UJ				< 0.0003 UJ
						< 0.0012 UJ	0.0033 J	0.003 J				0.005 J
						< 0.001 UJ	< 0.0014 UJ	< 0.001 UJ				< 0.0003 UJ
						< 0.0011 UJ	< 0.0015 UJ	< 0.001				< 0.0003
						0.0033 J	< 0.0013 UJ	< 0.001				< 0.0003
						< 0.0011 UJ	< 0.0014 UJ	< 0.001				< 0.0003
						< 0.0011 UJ	< 0.0014 UJ	< 0.001				< 0.0003
					1.4 NJ	< 0.06	< 0.08	0.22 J	4.4 NJ	2 NJ	3.6 NJ	0.33
						< 0.0011 UJ	< 0.0015 UJ	< 0.001 UJ				< 0.0003 UJ
						0.002 J	< 0.0014 UJ	< 0.001				< 0.0003
						< 0.05 UJ	< 0.07 UJ	< 0.05				< 0.01
						0.0028 J	< 0.0013 UJ	< 0.001				< 0.0003
						< 0.0012 UJ	< 0.0016 UJ	< 0.0011				< 0.0004
						< 0.06	< 0.08	< 0.057				< 0.018
						< 0.28	< 0.37	< 0.26				< 0.084
						< 0.29	< 0.38	< 0.27				< 0.087
						0.0045 J	< 0.0015	< 0.0011				< 0.0003
						0.0033 J	< 0.0018 UJ	< 0.0012				< 0.0004
						0.0051 J	< 0.0013 UJ	< 0.0009				< 0.0003
						0.0099 J	< 0.0014 UJ	< 0.001 UJ				< 0.0003 UJ
						0.0051 J	< 0.0019 UJ	< 0.0013				< 0.0004
						< 0.0012 UJ	< 0.0016 UJ	< 0.0011 UJ				< 0.0004 UJ
						< 0.05 UJ	< 0.07 UJ	< 0.05				< 0.01
						< 0.0039 UJ	< 0.0014 UJ	< 0.001 UJ				< 0.0003 UJ
						< 0.0045 UJ	0.0054 J	< 0.001 UJ				< 0.0003 UJ
						< 0.0028 UJ	< 0.0014 UJ	< 0.001				< 0.0003
						< 0.0015 UJ	< 0.002 UJ	< 0.0014				< 0.0005
Number of Detects:				1	1	14	3	3	1	1	1	3
Total Number of Analyses:				75	75	75	75	75	75	75	75	75
Minimum Concentration:				2	1.4	0.0016	0.0033	0.003	4.4	2	3.6	0.005
Maximum Concentration:				2	1.4	0.0099	0.17	0.97	4.4	2	3.6	3.2
Mean Detected Concentration:				2	1.4	0.0044	0.0566	0.398	4.4	2	3.6	1.178

Table 6-2. Detected Analytes in Soil*
VOCs (mg/kg), 50 Series Complex
(Page 6 of 6)

Location ID	Sample Date	Depth (feet)	Soil Code	m-XYLENE	o-CYMENE (p-ISOPROPYLTOLUENE)	PENTABROMOBENZENE	sec-BUTYLBENZENE	TETRACHLOROETHENE	TOLUENE	trans-1,2-DICHLOROETHENE	TRICHLOROETHENE
				< 0.0002	< 0.0007		< 0.0004	< 0.0003	0.0018 J	< 0.0004	0.0015 J
				0.065 J	0.13 J		0.4	< 0.013	< 0.017	< 0.016	< 0.014
				< 0.0003 UJ	< 0.0012 UJ		< 0.0003 UJ	< 0.0002 UJ	0.0022 J	< 0.0003 UJ	0.017 J
				< 0.0002 UJ	< 0.0007 UJ		< 0.0004 UJ	< 0.0003 UJ	< 0.0002 UJ	< 0.0003 UJ	0.014 J
				< 0.0004	< 0.03		< 0.02	< 0.01	< 0.01	< 0.01	2.1
				< 0.0002	< 0.0006		< 0.0003	< 0.0002	< 0.0002	< 0.0003	< 0.0002
				< 0.0002	< 0.0006		< 0.0003	< 0.0002	< 0.0002	< 0.0003	< 0.0002
				< 0.0088	< 0.031 UJ		< 0.018 UJ	< 0.011	< 0.0098	< 0.015	0.44 J
				< 0.0002 UJ	< 0.0008 UJ		< 0.0004 UJ	< 0.0002 UJ	< 0.0002 UJ	< 0.0003 UJ	< 0.0002 UJ
				< 0.0002	< 0.0007		< 0.0004	< 0.0003	< 0.0002	< 0.0004	0.0025 J
				< 0.0002 UJ	< 0.0007 UJ		< 0.0004 UJ	< 0.0002 UJ	< 0.0002	< 0.0003	0.0027 J
				< 0.0002	< 0.0008 UJ		< 0.0004 UJ	< 0.0003	< 0.0002	0.047 J	0.092 J
				< 0.0002	< 0.0006		< 0.0004	< 0.0002	0.0026 J	< 0.0003	0.0045 J
				< 0.0002	< 0.0006		< 0.0004	< 0.0002	0.0023 J	< 0.0003	0.0021 J
				< 0.0002	< 0.0006		< 0.0004	< 0.0002	0.0047 J	< 0.0003	< 0.0002
				< 0.0003	< 0.001		< 0.0006	< 0.0004	< 0.0003	< 0.0005	0.072
				< 0.0097	< 0.03		< 0.02	< 0.01	< 0.01	< 0.01	1.4
				< 0.0002	< 0.0008		< 0.0005	< 0.0003	< 0.0002	< 0.0004	
				< 0.0002	< 0.0007		< 0.0004	< 0.0003	0.0042 J	< 0.0003	0.0061
				< 0.0002	< 0.0006		< 0.0003	< 0.0002	0.0022 J	< 0.0003	< 0.0002
				< 0.0002	< 0.0006		< 0.0004	< 0.0002	< 0.0002	< 0.0003	0.0088
				< 0.0002	< 0.0007		< 0.0004	< 0.0003	0.0027 J	< 0.0004	0.0056 J
				< 0.0002	< 0.0006		< 0.0003	< 0.0002	< 0.0002	< 0.0003	0.024
				< 0.0002	< 0.0007		< 0.0004	< 0.0003	0.0017 J	< 0.0003	0.0078
				< 0.0002	< 0.0006		< 0.0003	< 0.0002	< 0.0002	< 0.0003	0.019
				< 0.0002	< 0.0006		< 0.0004	< 0.0002	0.0032 J	< 0.0003	0.021
				0.0009 J	< 0.0007		< 0.0004	< 0.0003	0.0056 J	< 0.0004	0.019
				< 0.0002	< 0.0007		< 0.0004	< 0.0002	< 0.0002	< 0.0003	0.0027 J
				< 0.0002	< 0.0008 UJ		< 0.0005 UJ	< 0.0003	< 0.0002	< 0.0004	0.023
				< 0.0002	< 0.0007		< 0.0004	< 0.0002	< 0.0002	< 0.0003	0.011
				< 0.0002	< 0.0007		< 0.0004	< 0.0003	< 0.0002	< 0.0003	< 0.0002
				< 0.0002	< 0.0007		< 0.0004	< 0.0003	0.0025 J	< 0.0004 UJ	0.056 J
				< 0.0002 UJ	< 0.0008 UJ		< 0.0004 UJ	< 0.0002 UJ	< 0.0002 UJ	< 0.0003 UJ	0.0048 J
				< 0.0002 UJ	< 0.0008 UJ		< 0.0004 UJ	< 0.0002 UJ	0.0085 J	< 0.0003 UJ	0.052 J
				< 0.0002	< 0.0009		< 0.0005	< 0.0003	< 0.0003	< 0.0004	0.038 J
				< 0.0002	< 0.0009		< 0.0005	< 0.0003	< 0.0003	< 0.0004	0.036
				< 0.0003	< 0.0009		< 0.0005	< 0.0003	< 0.0003	< 0.0004	0.037
				< 0.0002	< 0.0008		< 0.0005	< 0.0003	< 0.0003	< 0.0004	0.11 J
				< 0.0002	< 0.0008		< 0.0005	< 0.0003	< 0.0003	< 0.0004	0.074
				< 0.0093	< 0.033		< 0.019	< 0.012	< 0.01	< 0.016	6.9
				< 0.0003	< 0.0009		< 0.0005	< 0.0003	< 0.0003	< 0.0005	0.009
				< 0.0002	< 0.0007		< 0.0004	< 0.0003	< 0.0002	< 0.0004	0.021
				< 0.0002 UJ	< 0.0008 UJ		< 0.0004 UJ	< 0.0002 UJ	< 0.0002 UJ	< 0.0003 UJ	0.0028 J
				0.0009 J	0.0039 J		0.0018 J	< 0.0003	< 0.0002	< 0.0004	0.004 J
				< 0.0002 UJ	< 0.0008 UJ		< 0.0004 UJ	< 0.0002 UJ	< 0.0002 UJ	< 0.0003 UJ	< 0.0002 UJ
				< 0.0002	< 0.0007		< 0.0004	< 0.0003	< 0.0002	< 0.0003	< 0.0002
				< 0.0002	< 0.0006		< 0.0004	< 0.0002	< 0.0002	< 0.0003	< 0.0002
				< 0.0002	< 0.0007		< 0.0004	< 0.0002	< 0.0002	< 0.0003 UJ	0.016
				< 0.0002	< 0.0007		< 0.0004	< 0.0002	< 0.0002	< 0.0003 UJ	0.0041 J
				< 0.011	0.33		< 0.022	< 0.014	< 0.012	< 0.018	< 0.012
				< 0.0002 UJ	< 0.0007 UJ		< 0.0004 UJ	< 0.0003 UJ	< 0.0002 UJ	< 0.0003 UJ	0.0035 J
				< 0.0002	< 0.0006		< 0.0004	< 0.0002	< 0.0002	< 0.0003	< 0.0002
				< 0.0092	< 0.03		< 0.01	< 0.01	< 0.01	< 0.01	0.44
				< 0.0002	< 0.0006		< 0.0004	< 0.0002	< 0.0002	< 0.0003 UJ	0.03
				< 0.0002	< 0.0007		< 0.0004	< 0.0003	< 0.0002	< 0.0004	0.0065
				< 0.011	< 0.037		< 0.022	< 0.014	< 0.012	< 0.018	0.25 J
				< 0.048	< 0.17		< 0.1	< 0.062	0.81 J	< 0.084	38
				< 0.05	< 0.18		< 0.1	< 0.065	0.47 J	< 0.088	62
				< 0.0002	< 0.0007		< 0.0004	< 0.0003	< 0.0002	0.0027 J	0.023
				< 0.0002	< 0.0008		< 0.0005	< 0.0003	< 0.0003	< 0.0004	< 0.0003
				< 0.0002	< 0.0008		< 0.0004	0.0047 J	0.0046 J	< 0.0003	8.7
				< 0.0002 UJ	< 0.0007 UJ		< 0.0004 UJ	< 0.0002 UJ	0.0087 J	< 0.0003 UJ	0.039 J
				< 0.0003	< 0.0009		< 0.0005	< 0.0003	< 0.0003	0.0016 J	3.8
				< 0.0002 UJ	< 0.0007 UJ		< 0.0004 UJ	< 0.0003 UJ	< 0.0002 UJ	0.021 J	0.076 J
				< 0.0095	< 0.03		< 0.02	< 0.01	< 0.01	< 0.01	1.5
				< 0.0002 UJ	< 0.0007 UJ		< 0.0004 UJ	< 0.0002 UJ	< 0.0002 UJ	< 0.0003 UJ	0.0078 J
				< 0.0002	< 0.0007 UJ		< 0.0004 UJ	< 0.0002	< 0.0002	< 0.0003	0.0034 J
				< 0.0002	< 0.0007	0.0056 NJ	< 0.0004	< 0.0003	< 0.0002	< 0.0003	< 0.0002
				< 0.0003	< 0.0009		< 0.0006	< 0.0004	< 0.0003	< 0.0005	< 0.0003

Number of Detects:	3	3	1	2	1	17	4	53	
Total Number of Analyses:	75	75	75	75	75	75	75	75	
Minimum Concentration:	0.0009	0.0039	0.0056	0.0018	0.0047	0.0017	0.0018	0.0015	
Maximum Concentration:	0.065	0.33	0.0056	0.4	0.0047	0.61	0.047	62	
Mean Detected Concentration:	0.0223	0.1546	0.0056	0.2009	0.0047	0.0869	0.0181	2.7849	

Table 6-3. Detected Analytes in Soil Gas
VOCs (PPBV), 50 Series Complex

Location-ID	Sample Date	Depth (feet)	1,1-DICHLOROETHENE	1,2,4-TRIMETHYLBENZENE	1,3,5-TRIMETHYLBENZENE	2-ETHYLTOLUENE	2-METHYLBUTANE	3-HEPTANONE	ACETONE	BENZENE	CARBON DISULFIDE	CHLOROETHANE	CHLOROFORM	CHLOROMETHANE	cis-1,2-DICHLOROETHENE	CIS-2-BUTENE	CIS-DECAHYDRONAPHTHALENE	ETHANOL	ISOPROPANOL	m,p-XYLENE	METHYL ETHYL KETONE	METHYL tert-BUTYL ETHER	METHYLENE CHLORIDE	n-BUTANAL	N-PENTANE(C5)	PROPYLENE	TOLUENE	trans-1,2-DICHLOROETHENE	TRICHLOROETHENE	VINYL CHLORIDE
B055SB001	September 17, 1999	0 - 0	< 0.72	1 J	< 0.72				5.5 J	< 0.72	< 2.9	< 0.72	< 0.72	< 0.72	< 0.72			< 2.9	< 2.9	< 0.72	< 2.9	< 2.9	< 0.72			< 2.9	1.3 J	< 2.9	< 0.72	< 0.72
B055SB001	September 17, 1999	6.3 - 6.5	< 1.2	< 1.2	< 1.2		10 NJ		56	2.7 J	< 5	< 1.2	< 1.2	< 1.2	< 1.2	13 NJ		9.5 J	< 5	1.4 J	8.3 J	< 5	< 1.2			< 5	4.7 J	< 5	13	< 1.2
B056AHA001	September 27, 1999	4.9 - 5	< 4	< 4	< 4				42 J	< 4	< 16	< 4	< 4	< 4	270 J		860 NJ	< 16	< 16	< 4	< 16	< 16	< 4			21 J	4.2 J	100 J	84 J	34 J
B056AHA002	September 27, 1999	4.9 - 5	10	< 1.4	< 1.4				30	< 1.4	< 5.6	< 1.4	1.5 J	< 1.4	70			< 5.6	< 5.6	< 1.4	< 5.6	< 5.6	< 1.4			< 5.6	< 1.4	85	540	< 1.4
B056AHA003	September 27, 1999	3.2 - 3.3	< 0.7	< 0.7	< 0.7			3.4 NJ	28	< 0.7	5.7 J	< 0.7	< 0.7	0.73 J	< 0.7			4.9 J	< 2.8	< 0.7	6.5 J	2.8 J	< 0.7			< 2.8	1.3 J	< 2.8	< 0.7	< 0.7
B056BHA001	September 27, 1999	0 - 0	< 0.7	< 0.7	< 0.7				6.6 J	< 0.7	3.2 J	< 0.7	< 0.7	< 0.7	0.91 J			< 2.8	< 2.8	< 0.7	< 2.8	< 2.8	< 0.7			< 2.8	1.3 J	< 2.8	13	< 0.7
B056BHA003	September 24, 1999	0 - 0	< 0.78	3.9	1.1 J	4.7 NJ	9.5 NJ		22	< 0.78	< 3.1	0.85 J	< 0.78	1.7 J	< 0.78			14	< 3.1	1.2 J	< 3.1	3.6 J	< 0.78		4.2 NJ	< 3.1	7.6	< 3.1	4.7	< 0.78
B056BHA003	September 24, 1999	6.8 - 7	< 4.9	5.1 J	< 4.9				120	< 4.9	< 19	< 4.9	< 4.9	< 4.9	6.7 J			< 19	< 19	< 4.9	< 19	< 19	< 4.9	35 NJ		< 19	10 J	< 19	1800	< 4.9
B056HA003	September 27, 1999	2.8 - 3	< 1.4	< 1.4	< 1.4				64	< 1.4	< 5.6	< 1.4	< 1.4	< 1.4	18			< 5.6	< 5.6	< 1.4	12 J	< 5.6	1.7 J			< 5.6	< 1.4	< 5.6	300	< 1.4
B057AHP008	September 16, 1999	0 - 0	< 2.2	< 2.2	< 2.2				11 J	< 2.2	< 8.9	< 2.2	< 2.2	< 2.2	< 2.2			< 8.9	< 8.9	< 2.2	< 8.9	< 8.9	< 2.2			< 8.9	< 2.2	< 8.9	< 2.2	< 2.2
B057ASB001	September 16, 1999	5.8 - 6	< 430	< 430	< 430				< 1700	< 430	< 1700	< 430	< 430	< 430	29000			< 1700	< 1700	< 430	< 1700	< 1700	< 430			< 1700	< 430	12000	140000	< 430
B057HA005	September 27, 1999	3.4 - 3.5	< 0.67	< 0.67	< 0.67				11	< 0.67	< 2.7	< 0.67	< 0.67	< 0.67	2.2 J			14	14	0.81 J	< 2.7	2.8 J	1.2 J			< 2.7	1.9 J	< 2.7	62	< 0.67
Number of Detects:			1	3	1	1	2	1	11	1	2	1	1	2	7	1	1	4	1	3	3	3	2	1	1	1	8	3	9	1
Total Number of Analyses:			12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Minimum Concentration:			10	1	1.1	4.7	9.5	3.4	5.5	2.7	3.2	0.85	1.5	0.73	0.91	13	860	4.9	14	0.81	6.5	2.8	1.2	35	4.2	21	1.3	85	4.7	34
Maximum Concentration:			10	5.1	1.1	4.7	10	3.4	120	2.7	5.7	0.85	1.5	1.7	29000	13	860	14	14	1.4	12	3.6	1.7	35	4.2	21	10	12000	140000	34
Mean Detected Concentration:			10	3.3	1.1	4.7	9.8	3.4	36.0	2.7	4.5	0.85	1.5	1.22	4195.40	13	860	10.6	14	1.14	8.9	3.1	1.5	35	4.2	21	4.0	4062	15868.5	34

QUALIFIER LEGEND:

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

NJ The analyte identification is presumptive. Reported value is an estimated concentration.

Table 6-4. Detected Analytes in Water
VOCs (ug/L), 50 Series Complex

Location-ID	Sample Date	Depth (feet)	1,1,2-TRICHLOROETHANE	1,1,3-TRIMETHYLCYCLOHEXANE	1,1,3-TRIMETHYLCYCLOPENTANE	1,1-DICHLOROETHANE	1,1-DICHLOROETHENE	1,1-DIMETHYLCYCLOHEXANE	1,2,3,4-TETRAMETHYLBENZENE	1,2,4,5-TETRAMETHYLBENZENE	1,2,4-TRIMETHYLBENZENE	1,2,4-TRIMETHYLCYCLOHEXANE	1,2-DICHLOROETHANE	1,2-DIMETHYLCYCLOPENTANE	1,3,5-TRIMETHYLBENZENE	1,3-DIMETHYLCYCLOPENTANE	1,CIS-2,TRANS-4-TRIMETHYLCYCLOPENTANE	1H-INDENE,2,3-DIHYDRO-1,2-DIMETHYL	1-ISOPROPENYL-3-ISOPROPYLBENZENE	1-METHYL-1-PROPENYLBENZENE	1-METHYLCYCLOHEXENE	1-PENTENE
B053SB001	September 10, 1999	4	< 0.23			< 0.22	< 0.22				< 0.41		< 0.18		< 0.23							
B053SB002	September 10, 1999	4	< 0.23			0.55 J	< 0.22				< 0.41		< 0.18		< 0.23							
B053TR001	June 7, 1999	6.5	< 8.3			< 18	< 5.3		120 NJ		36		< 9.1		81							
B056SB002	September 17, 1999	9.5	< 1.2			< 1.1	< 1.1				< 2		< 0.89		< 1.1							
B056SB003	September 20, 1999	7	6.6			< 0.22	< 0.22				< 0.41		1.9		< 0.23							
B057AGR001	September 28, 1999	6	< 0.23			< 0.22	2.5				< 0.41 UJ		< 0.18		< 0.23							
B057AHP002	September 16, 1999	17	< 0.23	99 NJ	47 NJ	46	170	61 NJ		24 NJ	39	40 NJ	< 0.18		< 0.23	25 NJ	39 NJ					
B057AHP003	September 15, 1999	17	< 12	110 NJ		< 11	< 11				95		< 8.9	550 NJ	< 11						110 NJ	270 NJ
B057AHP004	September 13, 1999	6	< 120			< 110	< 110				< 200		< 89		< 110							
B057AHP005	September 10, 1999	8	< 0.23			0.26 J	< 0.22				< 0.41		< 0.18		< 0.23							
B057AHP006	September 9, 1999	6	< 0.23			< 0.22	< 0.22				< 0.41		< 0.18		< 0.23			3.2 NJ	1.4 NJ	1.6 NJ		
B057AHP008	September 16, 1999	8	< 0.23			< 0.22	0.36 J				< 0.41		< 0.18		< 0.23							
B057HA004	September 28, 1999	0.5	3			< 0.22	14				< 0.41 UJ		2.7		< 0.23							
B120SB001	September 20, 1999	4	< 0.23			< 0.22	< 0.22				< 0.41		< 0.18		< 0.23							
B120SB002	September 20, 1999	4	< 0.23			< 0.22	< 0.22				< 0.41		< 0.18		< 0.23							
Number of Detects:			2	2	1	3	4	1	1	1	3	1	2	1	1	1	1	1	1	1	1	1
Total Number of Analyses:			15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
Minimum Concentration:			3	99	47	0.26	0.36	61	120	24	36	40	1.9	550	81	25	39	3.2	1.4	1.6	110	270
Maximum Concentration:			6.6	110	47	46	170	61	120	24	95	40	2.7	550	81	25	39	3.2	1.4	1.6	110	270
Mean Detected Concentration:			4.8	105	47	15.60	46.72	61	120	24	57	40	2.3	550	81	25	39	3.2	1.4	1.6	110	270

QUALIFIER LEGEND:

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
NJ The analyte identification is presumptive. Reported value is an estimated concentration.
UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sa

Table 6-4. Detected Analytes in Water
VOCs (ug/L), 50 Series Complex
(Page 2 of 3)

Location-ID	Sample Date	Depth (feet)	2,3-DIHYDRO-1,2-DIMETHYL-1H-INDENE	2,3-DIHYDRO-1,3-DIMETHYL-1H-INDENE	2,5-DIMETHYLSTYRENE	2-ETHYLTOLUENE	2-METHYLBUTANE	2-METHYLPENTANE	3,5-DIMETHYLCYCLOXENE	3-METHYL-1-HEXENE	4-METHYLCYCLOHEXENE	BENZENE	BENZENE, 1-(1-METHYLETHENYL)	BICYCLO_3_3_0_OCTANE	BICYCLO_3_3_1_NONANE	BROMODICHLOROMETHANE	CARBON DISULFIDE	CHLOROBENZENE	CHLOROFORM	CIS,CIS,CIS-1,2,3-TRIMETHYLCYCLOPENTANE	cis-1,2-DICHLOROETHENE	cis-1,2-DIMETHYLCYCLOHEXANE	CYCLOPENTANE	ETHYLBENZENE	HEXANE(C6)
B053SB001	September 10, 1999	4										< 0.17				< 0.17	< 0.16	< 0.22	< 0.23		2.3			< 0.27	
B053SB002	September 10, 1999	4					1.3 NJ					< 0.17				< 0.17	< 0.16	< 0.22	< 0.23		1.3			< 0.27	
B053TR001	June 7, 1999	6.5	100 NJ			50 NJ						8.1 J				< 5.8	< 7.6	< 4.5	< 7.6		14 J			170	
B056SB002	September 17, 1999	9.5										< 0.83				< 0.83	< 0.79	< 1.1	43		5.8			< 1.4	
B056SB003	September 20, 1999	7										< 0.17				4.5	< 0.16	< 0.22	22		700			< 0.27	
B057AGR001	September 28, 1999	6										< 0.17				< 0.17	< 0.16	270	< 0.23 UJ		2000			< 0.27	
B057AHP002	September 16, 1999	17			25 NJ							0.47 J		29 NJ	60 NJ	< 0.17	< 0.16	< 0.22	< 0.23	38 NJ	11	98 NJ		4.7	
B057AHP003	September 15, 1999	17				100 NJ	850 NJ	150 NJ	110 NJ	110 NJ	110 NJ	230				< 8.2	< 7.9	< 11	< 12		10000			240	110 NJ
B057AHP004	September 13, 1999	6										< 83				< 82	< 80	< 110	< 120		1200			< 140	
B057AHP005	September 10, 1999	8										< 0.17				< 0.17	1.2	< 0.22	< 0.23		1.5			< 0.27	
B057AHP006	September 9, 1999	6	2.1 NJ	1 NJ								< 0.17	1.6 NJ			1.2	0.33 J	< 0.22	6.3		13			< 0.27	
B057AHP008	September 16, 1999	8										< 0.17				< 0.17	< 0.16	1.5	0.6 J		69			< 0.27	
B057HA004	September 28, 1999	0.5										11				< 0.17	< 0.16	0.82 J	12 J		2000		4.8 NJ	< 0.27	
B120SB001	September 20, 1999	4										< 0.17				< 0.17	< 0.16	< 0.22	0.68 J		74			< 0.27	
B120SB002	September 20, 1999	4										< 0.17				< 0.17	15	< 0.22	< 0.23		2.5			< 0.27	
Number of Detects:			2	1	1	2	2	1	1	1	1	4	1	1	1	2	3	3	6	1	15	1	1	3	1
Total Number of Analyses:			15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
Minimum Concentration:			2.1	1	25	50	1.3	150	110	110	110	0.47	1.6	29	60	1.2	0.33	0.82	0.6	38	1.3	98	4.8	4.7	110
Maximum Concentration:			100	1	25	100	850	150	110	110	110	230	1.6	29	60	4.5	15	270	43	38	10000	98	4.8	240	110
Mean Detected Concentration:			51.1	1	25	75	425.7	150	110	110	110	62.39	1.6	29	60	2.9	5.51	90.77	14.1	38	1073	98	4.8	138.2	110

mple.

Table 6-4. Detected Analytes in Water
VOCs (ug/L), 50 Series Complex

Location-ID	Sample Date	Depth (feet)	INDANE	ISOPROPYL ETHER	ISOPROPYLBENZENE	m,p-XYLENE	METHYL tert-BUTYL ETHER	METHYLCYCLOHEXANE	METHYLCYCLOPENTANE	METHYLDIHYDROINDENE	METHYLENE CHLORIDE	NAPHTHALENE	n-BUTYLBENZENE	N-PENTANE(C5)	n-PROPYLBENZENE	O-CYMENE	o-XYLENE	P-CYMENE (p-ISOPROPYLTOLUENE)	sec-BUTYLBENZENE	tert-BUTYLBENZENE	TETRACHLOROETHENE	TOLUENE	trans-1,2-DICHLOROETHENE	trans-1,3-DIMETHYLCYCLOHEXANE	TRICHLOROETHENE	VINYL CHLORIDE
B053SB001	September 10, 1999	4		< 0.07	< 0.29	< 0.51	< 0.1				< 0.5 UJ	< 0.36 UJ	< 0.38		< 0.25		< 0.21	< 0.36	< 0.29	< 0.25	< 0.31	< 0.19	0.77 J		1.9	< 0.28
B053SB002	September 10, 1999	4		< 0.07	< 0.29	< 0.51	0.59 J				< 0.28	< 0.36 UJ	< 0.38		< 0.25		< 0.21	< 0.36	< 0.29	< 0.25	< 0.31	< 0.19	< 0.19		0.84 J	1.1
B053TR001	June 7, 1999	6.5		< 1.5	44	43	< 0.8			200 NJ	< 5.8	390	50		130		< 4.9	< 6.1	13 J	< 8.2	< 5	< 3.8	< 5.5		15 J	< 5.4
B056SB002	September 17, 1999	9.5		< 0.4	< 1.4	< 2.5	< 0.52				< 4.7 UJ	< 1.8	< 1.9		< 1.2		< 1	< 1.8	< 1.4	< 1.2	< 1.6	< 0.92	< 0.96		37	< 1.4
B056SB003	September 20, 1999	7		< 0.079	< 0.29	< 0.51	< 0.1				< 0.28	< 0.36 UJ	< 0.38		< 0.25		< 0.21 UJ	< 0.36	< 0.29	< 0.25	< 0.31	< 0.19	1.4		2200	< 0.28
B057AGR001	September 28, 1999	6		< 0.079	< 0.29	< 0.51	4.7				< 0.28	< 0.36	< 0.38 UJ		< 0.25 UJ		< 0.21	< 0.36 UJ	< 0.29 UJ	< 0.25	< 0.31 UJ	0.6	4.2		560	400
B057AHP002	September 16, 1999	17		< 0.079	66	2.8	< 0.1			74 NJ	< 0.28	< 0.36	7.4		24	29 NJ	2.6	8.2	18	3.3	< 0.31	0.24 J	0.28 J	34 NJ	13	2.1
B057AHP003	September 15, 1999	17	170 NJ	< 4	70	< 25	< 5.2	1200 NJ	1600 NJ	220 NJ	< 14	< 18	< 19	1000 NJ	68		11 J	< 18	< 14	< 12	< 16	27	63		550 J	< 14
B057AHP004	September 13, 1999	6		< 39	< 140	< 250	< 52				< 140	< 180	< 190		< 120		< 100	< 180	< 140	< 120	< 160	< 92	210 J		3800	< 140
B057AHP005	September 10, 1999	8		0.2 J	< 0.29	< 0.51	0.52 J				< 0.47 UJ	< 0.36 UJ	< 0.38		< 0.25		< 0.21	< 0.36	< 0.29	< 0.25	< 0.31	< 0.19	< 0.19		< 0.2	0.56 J
B057AHP006	September 9, 1999	6		< 0.07	< 0.29	< 0.51	< 0.1				< 0.28 UJ	< 0.36 UJ	< 0.38		< 0.25		< 0.21	< 0.36	< 0.29	< 0.25	< 0.31	< 0.19	< 0.19		25	< 0.28
B057AHP008	September 16, 1999	8		< 0.079	< 0.29	< 0.51	17				1.6 J	< 0.36	< 0.38		< 0.25		< 0.21	< 0.36	< 0.29	< 0.25	< 0.31	< 0.19	25		390	< 0.28
B057HA004	September 28, 1999	0.5		< 0.079	< 0.29	< 0.51	< 0.1		1.1 NJ		< 0.28	< 0.36	< 0.38 UJ		< 0.25 UJ		< 0.21	< 0.36 UJ	< 0.29 UJ	< 0.25	2.7 J	< 0.19	270 J		8500	97 J
B120SB001	September 20, 1999	4		< 0.079	< 0.29	< 0.51	< 0.1				< 0.28	< 0.36 UJ	< 0.38		< 0.25		< 0.21 UJ	< 0.36	< 0.29	< 0.25	< 0.31	< 0.19	< 0.19		0.47 J	70
B120SB002	September 20, 1999	4		< 0.079	< 0.29	< 0.51	< 0.1				< 0.28	< 0.36 UJ	< 0.38		< 0.25		< 0.21 UJ	< 0.36	< 0.29	< 0.25	< 0.31	< 0.19	< 0.19		0.88 J	13
Number of Detects:			1	1	3	2	4	1	2	3	1	1	2	1	3	1	2	1	2	1	1	3	8	1	14	7
Total Number of Analyses:			15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
Minimum Concentration:			170	0.2	44	2.8	0.52	1200	1.1	74	1.6	390	7.4	1000	24	29	2.6	8.2	13	3.3	2.7	0.24	0.28	34	0.47	0.56
Maximum Concentration:			170	0.2	70	43	17	1200	1600	220	1.6	390	50	1000	130	29	11	8.2	18	3.3	2.7	27	270	34	8500	400
Mean Detected Concentration:			170	0.2	60	22.9	5.70	1200	800.6	165	1.6	390	28.7	1000	74	29	6.8	8.2	16	3.3	2.7	9.28	71.83	34	1149.58	83.39

Table 6-5. Detected Analytes in Soil
SVOCs (mg/kg), 50 Series Complex

Location-ID	Sample Date	Depth (feet)	Soil Code	1,1,3-TRIMETHYL-2-(3-METHYLPENTYL)CYCLOHEXANE	2,6,10,14-TETRAMETHYLPENTADECANE	2,6,10,15-TETRAMETHYL-HEPTADECANE	2,6,11-TRIMETHYLDODECANE	2,7,10-TRIMETHYLDODECANE	2-METHYLOCTADECANE	2-METHYLTRIDECANE	5-PROPYLTRIDECANE	7-METHYLTRIDECANE	9-OCTYLHEPTADECANE	bis(2-ETHYLHEXYL) PHTHALATE	BISPHENOL A	D-DIHOMOANDROSTAN-17B-ONE,(5_ALPHA_)	n-HENICOSANE (C21)	n-HEPTADECANE (C16)	n-HEXADECANE (C16)	n-HEXATRIACONTANE (C36)	n-OCTADECANE (C18)	N-PENTADECANE (C15)	n-TETRACOSANE (C24)	N-TETRADECANE (C14)	N-TETRATRIACONTANE (C34)	N-TRIDECANE (C13)
B055SB001	September 17, 1999	0.5 - 1	CL											< 0.16	0.23 NJ											
B056AHA001	September 24, 1999	0.7 - 1.2	CL											< 0.57		0.63 NJ		0.39 NJ								
B056AHA001	September 24, 1999	4.5 - 5	CL	2.4 NJ		2.7 NJ								< 5.9												
B056HA003	September 22, 1999	0.3 - 0.8	ML											< 0.16						0.3 NJ					0.3 NJ	
B056HA004	September 23, 1999	0.1 - 0.6	SM		0.83 NJ		1 NJ	0.38 NJ	2.3 NJ	2.4 NJ	1.4 NJ	2.4 NJ	2.2 NJ	< 0.31			2.7 NJ		1.2 NJ		2.4 NJ	2.4 NJ	2.4 NJ	1.1 NJ		2.8 NJ
B056SB002	September 16, 1999	9.5 - 10	CL											1 J												
B057BHA001	September 21, 1999	1 - 1.5	CL											1.1												
Number of Detects:				1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1
Total Number of Analyses:				35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35
Minimum Concentration:				2.4	0.83	2.7	1	0.38	2.3	2.4	1.4	2.4	2.2	1	0.23	0.63	2.7	0.39	1.2	0.3	2.4	2.4	2.4	1.1	0.3	2.8
Maximum Concentration:				2.4	0.83	2.7	1	0.38	2.3	2.4	1.4	2.4	2.2	1.1	0.23	0.63	2.7	0.39	1.2	0.3	2.4	2.4	2.4	1.1	0.3	2.8
Mean Detected Concentration:				2.4	0.83	2.7	1	0.38	2.3	2.4	1.4	2.4	2.2	1.1	0.23	0.63	2.7	0.39	1.2	0.3	2.4	2.4	2.4	1.1	0.3	2.8

QUALIFIER LEGEND:

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
NJ The analyte identification is presumptive. Reported value is an estimated concentration.

Table 6-6. Detected Analytes in Water
SVOCs (ug/L), 50 Series Complex

Location-ID	Sample Date	Depth (feet)	1,2,3-TRIMETHYLBENZENE	1,2,4,5-TETRAMETHYLBENZENE	1,2,4-TRIMETHYLBENZENE	1,2-DIMETHYL-4-ETHYLBENZENE	1-ETHYL-2,3-DIMETHYLBENZENE	2,3-DIHYDRO-4-METHYL-1H-INDENE	2,5-DIMETHYLSTYRENE	2-METHYLNAPHTHALENE	ETHYLBENZENE	FORMAMIDE	ISOPROPYLBENZENE	N-METHYLFORMAMIDE	N-PROPYLBENZENE	P-CYMENE
[redacted]				12 NJ		19 NJ			18 NJ	3.4 J			25 NJ			
[redacted]			70 NJ	11 NJ	58 NJ		43 NJ	19 NJ		6 J	63 NJ				45 NJ	29 NJ
[redacted]										< 2		5.4		5.4		
[redacted]										< 2		9.1				
Number of Detects:			1	2	1	1	1	1	1	2	1	2	1	1	1	1
Total Number of Analyses:			4	4	4	4	4	4	4	4	4	4	4	4	4	4
Minimum Concentration:			70	11	58	19	43	19	18	3.4	63	5.4	25	5.4	45	29
Maximum Concentration:			70	12	58	19	43	19	18	6	63	9.1	25	5.4	45	29
Mean Detected Concentration:			70	12	58	19	43	19	18	4.7	63	7.3	25	5.4	45	29

QUALIFIER LEGEND:

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

NJ The analyte identification is presumptive. Reported value is an estimated concentration.

Table 6-7. Detected Analytes in Soil
PAHs (mg/kg), 50 Series Complex

Location-ID	Sample Date	Depth (feet)	Soil Code	ACENAPHTHYLENE	ANTHRACENE	BENZO(a)ANTHRACENE	BENZO(a)PYRENE	BENZO(b)FLUORANTHENE	BENZO(g,h,i)PERYLENE	BENZO(k)FLUORANTHENE	CHRYSENE	DIBENZ(a,h)ANTHRACENE	FLUORANTHENE	FLUORENE	INDENO(1,2,3-c,d)PYRENE	NAPHTHALENE	PHENANTHRENE	PYRENE
B053SB001	September 10, 1999	3.5 - 4	ML	< 1.3	< 0.09	< 0.054	< 0.062	0.19 J	< 0.1	< 0.05	< 0.076	0.29 J	< 0.26	< 0.17	0.12 J	< 0.72	< 0.1	0.068 NJ
B055HA001	September 23, 1999	0.5 - 1	CL	< 0.0965	< 0.0627	< 0.0989	0.26 J	0.21 J	< 0.125	< 0.0265	0.21 J	0.45 J	1.3 J	< 0.171	0.17 J	< 0.579	0.45 J	0.21 NJ
B055HA002	September 9, 1999	0.5 - 1	ML	0.12 J	< 0.0031	0.029	0.028	0.04	0.029 J	0.014 J	0.057 J	0.0081 J	0.12 J	< 0.0085	0.029 J	< 0.0287	0.07 J	0.047 NJ
B055SB001	September 17, 1999	0.5 - 1	CL	< 0.0044	< 0.0029	< 0.0009	0.0016 NJ	0.0021 J	< 0.0057	< 0.001	< 0.0011	< 0.0014	< 0.0023	< 0.0078	< 0.0032	< 0.0265	0.0029 J	0.0027 NJ
B055SB001	September 17, 1999	6.5 - 7.5	SM	< 0.0043	< 0.0028	< 0.0009	< 0.0018	< 0.0017	< 0.0017	< 0.0012	< 0.0011	< 0.0014	< 0.0023	< 0.0077	< 0.0006	< 0.0259	0.0035 J	0.0016 NJ
B056AHA001	September 24, 1999	0.7 - 1.2	CL	< 0.0814	< 0.0056	< 0.0022	0.015 J	0.016 J	0.019 J	< 0.0038	0.015 J	< 0.007	0.028 J	< 0.0102	0.02 J	< 0.0444	0.038 J	0.016 NJ
B056AHA001	September 24, 1999	4.5 - 5	CL	< 1.69	< 0.115	< 0.069	0.31 J	< 0.17	0.4 J	0.22 J	< 0.0971	< 0.146	< 0.332	< 0.212	< 0.0817	< 0.92	< 0.133	< 0.166
B056AHA002	September 24, 1999	4.5 - 5	CL	< 0.101	< 0.0654	< 0.1	0.12 J	0.19 J	< 0.131	< 0.0277	0.13 J	< 0.033	0.41 J	< 0.179	0.32 J	< 0.604	0.094 J	0.2 NJ
B056AHA003	September 24, 1999	0.5 - 1	ML	< 0.0046	< 0.003	< 0.0009	< 0.002	< 0.0018	< 0.0018	< 0.0013	< 0.0014	< 0.0015	< 0.0024	< 0.0082	< 0.0007	< 0.0276	< 0.0042	0.0017 NJ
B056AHA004	September 7, 1999	3.8 - 4.4	ML	< 0.048	< 0.0312	< 0.0096	0.23 J	0.24 J	< 0.0624	0.72 J	< 0.0144	0.23 J	< 0.0408	< 0.0852	0.056 J	< 0.288	< 0.0204	0.17 NJ
B056BHA004	September 23, 1999	4.7 - 5.2	ML	0.027 J	< 0.0029	< 0.0009	0.0046 J	< 0.0018	< 0.0058	< 0.0012	< 0.0011	< 0.0014	< 0.0023	< 0.0079	0.0057 J	< 0.0266	< 0.0041	0.0014 NJ
B056HA002	September 22, 1999	0.3 - 0.8	SM	< 0.0054	< 0.0035	< 0.0011	0.012 J	0.011 J	< 0.0071	0.0046 J	0.0063 J	0.039 J	< 0.0046	< 0.0097	0.013 J	< 0.0327	0.0065 J	0.0065 NJ
B056HA002	September 22, 1999	3 - 3.5	SM	< 0.0045	< 0.0029	< 0.0009	0.0037 J	0.0026 J	< 0.0018	< 0.0012	< 0.0011	< 0.0015	< 0.0024	< 0.008	< 0.0007	< 0.027	0.0047 J	0.0034 NJ
B056HA004	September 23, 1999	0.1 - 0.6	SM	16 J	< 0.0282	< 0.445	0.092 J	0.076 J	< 0.0565	0.38 J	0.29 J	< 0.0141	9.9 J	0.75 J	< 0.0065	< 3.69	26 N	0.18 NJ
B056SB001	September 17, 1999	0.5 - 1	ML	0.064 NJ	< 0.0031	< 0.001	0.0062 J	< 0.0019	< 0.0062	< 0.0013	< 0.0014	< 0.0005	< 0.0041	< 0.0085	< 0.0035	< 0.0288	0.041 J	0.0098 NJ
B056SB003	September 17, 1999	0.5 - 1	CL	< 0.0881	< 0.006	< 0.0036	< 0.0039	< 0.0087	< 0.0069	< 0.0033	< 0.0047	< 0.013	< 0.016	< 0.0111	< 0.0036	< 0.0481	0.009 J	0.0076 NJ
B056SB004	September 15, 1999	1 - 2	ML	0.043 NJ	< 0.0029	< 0.0009	< 0.0019	0.0046 J	< 0.0018	< 0.0012	0.0045 J	< 0.0015	< 0.0024	< 0.008	< 0.0007	< 0.0269	0.028 J	0.0072 NJ
B057AHP002	September 15, 1999	1 - 2	CL	1.5 NJ	< 0.0054	0.045 J	0.072 J	0.13 J	< 0.0056	< 0.0037	0.2 J	0.085 J	0.62	< 0.0092	0.093 J	0.36 J	0.95 J	0.12 NJ
B057AHP004	September 13, 1999	3 - 3.5	ML	< 0.0047	< 0.0031	< 0.0009	< 0.002	< 0.0015	< 0.0019	< 0.0013	< 0.0012	< 0.0015	< 0.004	< 0.0083	< 0.0007	< 0.0282	< 0.002	0.0028 NJ
B057AHP006	September 9, 1999	2.5 - 3	ML	< 0.0758	0.09 J	< 0.0031	0.015 J	0.092 J	0.1 J	0.022 J	< 0.0044	< 0.0065	0.062	0.017 J	0.015 J	< 0.0413	0.13 J	0.042 NJ
B057ASB001	September 16, 1999	11.5 - 12	CL	< 0.0841	< 0.0057	< 0.0034	< 0.004	< 0.0083	< 0.0066	< 0.0032	< 0.0045	< 0.0124	< 0.0166	< 0.0106	< 0.0034	< 0.0459	0.01 J	< 0.0037
B057ASB001	September 16, 1999	19.5 - 20	CL	< 0.0846	< 0.0058	< 0.0035	< 0.004	< 0.0083	< 0.0067	< 0.0032	< 0.0049	< 0.0124	< 0.0167	< 0.0106	< 0.0035	< 0.0462	0.013 J	< 0.0037
B057BHA001	September 21, 1999	4 - 4.5	CL	< 0.0885	< 0.006	< 0.0036	< 0.0039	0.036	0.1 J	0.064 J	0.056 J	< 0.013	< 0.0174	< 0.0111	0.016 J	< 0.0483	< 0.007	0.0049 NJ
B065BHA003	September 8, 1999	1 - 1.5	ML	< 0.0908	0.34 J	0.51	0.75	0.65	0.51 J	0.31 J	0.68 J	< 0.0295	2.2 J	< 0.161	0.51 J	< 0.772	0.85 J	1 NJ
B065BHA003	September 8, 1999	3 - 3.5	ML	0.039 J	0.041 J	0.055	0.095	0.082	0.057 J	0.031	0.075 J	0.017 J	0.2 J	< 0.0084	0.051	< 0.0402	0.095 J	0.1 NJ
B065BHA004	September 8, 1999	2 - 2.5	ML	< 0.0467	0.061 J	0.18	0.22	0.22 J	0.17 J	0.13 J	0.22 J	< 0.0152	0.7 J	< 0.0828	0.16 J	< 0.28	0.34 J	0.31 NJ
B065BHA004	September 8, 1999	5.5 - 6	ML	< 0.0045	< 0.0029	< 0.0009	< 0.0019	< 0.0018	< 0.0018	< 0.0012	< 0.0013	< 0.0015	< 0.0023	< 0.0079	< 0.0007	< 0.0268	< 0.0019	0.0012 NJ
B120SB001	September 17, 1999	4.5 - 5	CL	< 0.0887	< 0.0061	< 0.0036	< 0.0042	< 0.0087	< 0.007	< 0.0034	< 0.0047	< 0.013	< 0.0175	< 0.0103	0.015 J	< 0.0484	< 0.007	< 0.0039
B120SB002	September 17, 1999	4 - 4.5	CL	< 0.0825	0.054 J	0.055 J	0.15 J	0.1 J	0.045 J	0.054 J	0.13 J	< 0.0071	< 0.15	0.014 J	0.072 J	< 0.045	0.21 J	0.14 NJ
Number of Detects:				7	5	6	18	18	9	11	13	7	10	3	16	1	20	25
Total Number of Analyses:				71	71	71	71	71	71	71	71	71	71	71	71	71	71	71
Minimum Concentration:				0.027	0.041	0.029	0.0016	0.0021	0.019	0.0046	0.0045	0.0081	0.028	0.014	0.0057	0.36	0.0029	0.0012
Maximum Concentration:				16	0.34	0.51	0.75	0.65	0.51	0.72	0.68	0.45	9.9	0.75	0.51	0.36	26	1
Mean Detected Concentration:				2.542	0.117	0.146	0.1325	0.1274	0.159	0.1772	0.1595	0.1599	1.554	0.260	0.1041	0.36	1.4673	0.1062

QUALIFIER LEGEND:

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

NJ The analyte identification is presumptive. Reported value is an estimated concentration.

Table 6-8. Detected Analytes in Water
PAHs (ug/L), 50 Series Complex

Location-ID	Sample Date	Depth (feet)	ACENAPHTHENE	ACENAPHTHYLENE	BENZO(a)ANTHRACENE	BENZO(a)PYRENE	BENZO(b)FLUORANTHENE	BENZO(g,h,i)PERYLENE	CHRYSENE	FLUORENE	INDENO(1,2,3-c,d)PYRENE	NAPHTHALENE	PHENANTHRENE	PYRENE
[illegible]	[illegible]	[illegible]	< 0.362	< 1.59	< 0.055	0.27	1.6 J	1.6 J	< 0.054	< 0.115	0.77 J	< 0.374	< 0.052	0.11 NJ
[illegible]	[illegible]	[illegible]	1000 J	120	< 0.08	0.09 J	< 0.19	0.72	< 0.08	50 J	0.29 J	220	0.57	< 0.16
[illegible]	[illegible]	[illegible]	190 J	1.9 NJ	< 0.0522	< 0.0522	< 0.0884	< 0.0836	< 0.0513	< 0.108	< 0.0371	< 0.355	4.1 J	< 0.0589
[illegible]	[illegible]	[illegible]		120 N	< 0.0517	< 0.0517	< 0.0874	< 0.0827	< 0.0508	< 0.107	< 0.0367	3.7 J	< 0.0489	< 0.0583
[illegible]	[illegible]	[illegible]	< 0.362	< 1.59	< 0.055	< 0.055	0.19 J	< 0.088	< 0.054	< 0.114	< 0.039	< 0.362	< 0.052	0.1 NJ
[illegible]	[illegible]	[illegible]	< 0.362	< 1.59	< 0.055	0.14 J	0.39 J	< 0.088	< 0.054	0.15 J	< 0.039	0.69 J	0.97 J	0.22 NJ
[illegible]	[illegible]	[illegible]	< 0.344	< 1.51	< 0.0522	< 0.0522	< 0.0884	< 0.0836	< 0.0513	1.4 J	< 0.0371	< 0.355	< 0.0494	< 0.0589
[illegible]	[illegible]	[illegible]	< 0.387	< 1.7	< 0.0589	< 0.0877	< 0.0995	< 0.214	0.23 J	< 0.123	< 0.0417	< 0.4	< 0.0556	< 0.0589
[illegible]	[illegible]	[illegible]	< 0.355	< 1.56	0.08 J	0.13 J	0.37 J	< 0.2	0.27	< 0.113	0.2 J	< 0.367	0.32 J	0.18 NJ
Number of Detects:			2	3	1	4	4	2	2	3	3	3	4	4
Total Number of Analyses:			9	9	9	9	9	9	9	9	9	9	9	9
Minimum Concentration:			190	1.9	0.08	0.09	0.19	0.72	0.23	0.15	0.2	0.69	0.32	0.1
Maximum Concentration:			1000	120	0.08	0.27	1.6	1.6	0.27	50	0.77	220	4.1	0.22
Mean Detected Concentration:			595	80.6	0.08	0.16	0.64	1.16	0.25	17.18	0.42	74.80	1.49	0.15

QUALIFIER LEGEND:

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sam

N The analyte identification is presumptive.

NJ The analyte identification is presumptive. Reported value is an estimated concentration.

Table 6-9. Detected Analytes in Soil
TPHs (mg/kg), 50 Series Complex

Location ID	Sample Date	Depth (feet)	Soil Code	DIESEL (C10-C24)	GASOLINE (~C6-C10)	MOTOR OIL (C20-C36)
				520 N		5400
				16		67
					24	
				52 N		220
				74 N		560
				1900		16000
				9.6		87
				19		57
				15 N		120
				8.4 N		200
				6.8		< 23
				1.8 J		< 23
				73 J		500 J
				4700		11000
					3.3	
				65		180
				240		1100
					0.41 J	
				100		< 24
				33		120
				1400		3800
					4.72	
				< 10 UJ		50 J
				6.1		< 14
				4.3 J		< 23
				4.1 J		< 23
				74 N		880
				5100		9900
				6.4		< 25
				5 J		< 18
				< 3.6 UJ		44 J
				5.1 J		< 18
				31 N		420
				1.3 J		< 25
				1.3 J		< 23
				1.3 J		< 25
					1.4 J	
				200		520
				4.4 J		< 15
				0.88 J		< 23
				5.3		< 23
				3.5 J		< 16
				4.8		< 15
				3.5 J		< 28
				3 J		< 25
				18		81
					2.03 J	
				110		750
				3.9 J		< 16
				3.9 J		< 14
				1.9 J		< 23
				2.1 J		< 23
				4.9 J		< 17
				5.4		< 17
				98		260
				130		1100
				16		84
				120 N		970
					2.22 J	
				45 N		450
				34 N		370
					0.29 J	
				0.79 J		< 23
				4.7		< 23
				6.3		< 23
				16		160
				110		730
					1.3	

Number of Detects:	57	9	31
Total Number of Analyses:	111	111	111
Minimum Concentration:	0.79	0.29	44
Maximum Concentration:	5100	24	16000
Mean Detected Concentration:	270.70	4.41	1812

QUALIFIER LEGEND:

J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

N — The analyte identification is presumptive.

UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

Table 6-10. Detected Analytes in Water
TPHs (ug/L), 50 Series Complex

Location-ID	Sample Date	Depth (feet)	DIESEL (C10-C24)	GASOLINE (~C6-C10)	MOTOR OIL (C20-C36)
B053SB001	[illegible]	[illegible]	55 J	< 12 UJ	< 54
B053SB002	[illegible]	[illegible]	100	< 12 UJ	< 54
B053SB011	[illegible]	[illegible]	3500	1300	< 240
B057AHP002	[illegible]	[illegible]		2300 J	
B057AHP003	[illegible]	[illegible]	380		< 54
B057AHP003	[illegible]	[illegible]	1300 J	51000	< 54 UJ
B057AHP004	[illegible]	[illegible]	< 37	21.9 J	< 53
B057AHP005	[illegible]	[illegible]	51 J	< 12	< 55
B057AHP006	[illegible]	[illegible]	110	16.5 J	< 54
B057AHP006	[illegible]	[illegible]	41 J	23 J	< 54
B057AHP007	[illegible]	[illegible]	130 J	< 12	2800 J
B057AHP008	[illegible]	[illegible]	2000 J	< 12	< 53 UJ

Number of Detects:	10	6	1
Total Number of Analyses:	12	12	12
Minimum Concentration:	41	16.5	2800
Maximum Concentration:	3500	51000	2800
Mean Detected Concentration:	767	9110.2	2800

QUALIFIER LEGEND:

J — The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ — The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

Table 6-11. Detected Analytes in Soil
Metals (mg/kg), 50 Series Complex
(Page 1 of 2)

Location-ID	Sample Date	Depth (feet)	Soil Code	ALUMINUM	ANTIMONY	ARSENIC	BARIUM	BERYLLIUM	CADMIUM	CALCIUM	CHROMIUM	COBALT	COPPER	IRON	LEAD	MAGNESIUM	MANGANESE	MERCURY	MOLYBDENUM	NICKEL	POTASSIUM	SELENIUM	SILVER	SODIUM	THALLIUM	TIN	VANADIUM	ZINC
B053SB001	September 10, 1999	3.5 - 4	ML												95.9													
B053SB002	September 10, 1999	3 - 3.5	CL												6.03			< 0.0279										
B053TR001	June 7, 1999	6.25 - 6.75	SM												285													
B053TR001	June 7, 1999	2.25 - 2.75	SM												189													
B053TR001	June 7, 1999	4 - 4.25	SM												5.51													
B055HA001	September 23, 1999	0.5 - 1	CL	11300		12.9	236	0.397	6.78	19200	266	15.2	2790	58600	1360	4970	1150		38.6	246	1330	0.165 J	1.63 J	342	0.594	65.8	50.6	2400
B055HA002	September 9, 1999	0.5 - 1	ML	14000	8.63 J	11.5	110	0.45	0.361 J	21000	34	8.8	460	30000	1640	6800	310	2.24	< 0.83	32	2200	< 0.28 UJ	< 0.42	1400	0.567	63	48	240
B055HA002	September 9, 1999	4 - 4.5	ML	11000	< 3.91 UJ	20.3	44	0.5	0.0868 J	4900	24	6.4	16	26000	7.01	6300	550	< 0.0262	< 0.79	16	2000	< 0.2 UJ	< 0.4	570	0.627	< 6.8 UJ	44	53
B055HA003	September 9, 1999	0.5 - 1	ML	9200		3.06	75	0.22	0.0897 J	2300	40	9	15	14000	3.69 J	3400	190	0.06 J	< 0.74	53	700 J	< 0.13 UJ	< 0.37	280	0.419 J	< 4.3 UJ	31	31
B055SB001	September 17, 1999	0.5 - 1	CL	12900	6.05 J	9.62	148	0.564	0.186 J	22000	32.5	7.83	31.1	27700	32.8	6660	332	10.4	< 0.767	23.5	2370	< 0.112	0.542 J	550	0.764	< 2.88 UJ	44.7	83
B055SB001	September 17, 1999	6.5 - 7.5	SM	15000	< 3.71 UJ	8.7	62.9	0.705	< 0.161	2480	38.4	8.22	11.5	40500	9.72	6690	200	< 0.0248	< 0.751	17.5	2740	< 0.11	0.879 J	787	0.535	< 2.83 UJ	56.1	71
B055SB001	September 17, 1999	10 - 11	SM	12400	< 3.8 UJ	6.53	34.3	0.555	< 0.164	2290	33.4	4.77	8.76	25200	5.02 J	6550	156	< 0.0254	< 0.768	9.39 J	2670	< 0.113	0.868 J	531	0.521	< 3.63 UJ	54.4	49.9
B056AHA001	September 24, 1999	0.7 - 1.2	CL	15000		10.7	89.4	0.582	0.243 J	18600	36	10.2	318	30200	306	6300	692	< 0.0284	< 0.858	28.2	2170	0.245 J	< 0.429	761	0.6	< 9.25 UJ	52.5	187
B056AHA001	September 24, 1999	4.5 - 5	CL	17100		5.13	92	0.709	< 0.19	4550	39.9	8.91	16.1	27000	8.68	5550	167	< 0.0294	< 0.889	22	3300	0.32 J	0.592 J	302	0.6	< 5.8 UJ	62.2	73.5
B056AHA002	September 24, 1999	0.1 - 0.6	CL	15400		9.77	97.2	0.636	< 0.181	10300	35.7	13.5	59.7	33500	397	5720	541	< 0.0279	< 0.846	25.4	1950	0.189 J	< 0.423	947	0.547	19	63	98.8
B056AHA002	September 24, 1999	4.5 - 5	CL	17300		10.2	101	0.5	< 0.187	2610	40.2	10.3	226	32500	126	5410	435	0.194	< 0.875	22.9	2270	< 0.128	0.499 J	272	0.538	< 6.92 UJ	59.6	145
B056AHA003	September 24, 1999	0.5 - 1	ML	16200		9.4	83.5	0.655	< 0.171	7180 J	39.2	11.6	21.2	61400	21.1	5550	474	< 0.0264	< 0.799	23.7	1770	0.362 J	< 0.4	538	0.502	< 1.88	55.4	69.8
B056AHA003	September 24, 1999	4.5 - 5	SM	14900		9.37	63.1	0.584	< 0.169	17800	34.8	9.95	14.9	27900	10	7350	278	< 0.026	< 0.787	20.3	1990	1.17 J	< 0.394	214	0.547	< 1.86	52.7	71.8
B056AHA004	September 7, 1999	0.8 - 1.4	CL			10.4							26		59.2													
B056AHA004	September 7, 1999	3.8 - 4.4	ML			9.65							16		8.99													
B056AHA005	September 7, 1999	0.75 - 1.25	CL										13		12													
B056AHA005	September 7, 1999	4.8 - 5.3	CL												9.7													
B056BHA001	September 23, 1999	0.3 - 0.8	SM	14500		11.8	85.3	0.604	< 0.163	3530	35.7	9.54	83.6	30800	12.1	7380	261	0.382	< 0.763	19.2	2960	0.204 J	0.552 J	192	0.618	< 1.8	53.6	109
B056BHA002	September 20, 1999	0.6 - 1.1	CL	14600		7.96	72.4	0.551	0.18 J	4340	30	7.32	26.2	31400	9.41	6410	348	< 0.0267	< 0.809	18.9	2590	0.273 J	< 0.405	838	0.605	< 1.91 UJ	44.7	67.4
B056BHA002	September 23, 1999	4.5 - 5	CL	25100		2.22 J	45.8	0.542	0.276 J	32200	58	7.34	38.5	25000	10.5	8980	141	< 0.0317	< 0.96	44	1670	1.22 J	< 0.48	714	0.579	< 4.42 UJ	37.7	78.1
B056BHA003	September 20, 1999	0.8 - 1.3	CL	15500		8.74	77.1	0.543	< 0.174	3910	33.9	7.67	24.3	29200	14.6	6240	271	< 0.0269	< 0.813	19.3	2370	0.336 J	< 0.598 UJ	703	0.649	< 1.92	49.8	63.6
B056BHA003	September 23, 1999	4.5 - 5	ML	12800		65.2	42.8	0.579	0.173 J	6490	31.6	8.43	13.8	27200	58.5	7020	209	< 0.0263	< 0.796	14.1 J	2210	< 0.117	0.786 J	458	0.579	< 1.88	47.9	89.8
B056BHA004	September 20, 1999	0.7 - 1.2	CL	15000		8.5	57.5	0.524	< 0.172	4110	32.5	6.56	16	29900	10.2	6510	257	< 0.0265	< 0.803	18	2470	0.274 J	< 0.401	765	0.576	< 1.89	49.7	61.9
B056BHA004	September 23, 1999	4.7 - 5.2	ML	14800		14.9	52.2	0.597	< 0.165	4910	38.9	12.5	13	42000	10.1	6270	270	< 0.0255	< 0.772	22	2500	0.284 J	< 0.386	206	0.591	< 2.79 UJ	51.1	69.9
B056GR001	September 21, 1999	0 - 0	ML	356	27.5 J	16.1	89.6	< 0.0339	82.6	6950	90.3	13.4	1790	12200	493	2550	104	0.272	31.2	197	< 94.7	0.474 J	2.38 J	15800	0.186 J	224	3.35 J	< 570 UJ
B056HA001	September 21, 1999	0.6 - 1.1	SM	13600	55.9 J	7.74	71.2	0.436	0.237 J	24600	42.3	6.33	66.9	26800	2100	6250	279	< 0.0279	< 0.846	22.8	1940	< 0.124	< 0.423	229	0.726	34.4	42	93.2
B056HA001	September 22, 1999	3 - 3.5	SM	16300	8.1 J	11.5	69.6	0.593	< 0.166	3560	38.3	8.09	58.8	34300	36.3	7640	255	< 0.0257	< 0.778	20.6	2910	< 0.114	< 0.389	200	0.648	< 1.83	53.4	84.4
B056HA002	September 22, 1999	0.3 - 0.8	SM	12300	5.2 J	10.6	94.5	0.449	0.425 J	7270	36.5	6.68	116	24600	979	5470	368	0.168	< 0.947	19.8	2150	0.261 J	< 0.473	225	0.537 J	36.7	42	205
B056HA002	September 22, 1999	3 - 3.5	SM	16800	5.84 J	17	78.8	0.621	0.278 J	4500	37.5	7.75	387	36000	94.1	7480	315	< 0.0258	< 0.782	30.7	2730	< 0.115	< 0.391	220	0.698	< 1.84	52.4	146
B056HA003	September 22, 1999	0.3 - 0.8	ML	17200	< 4 UJ	9.88	81.3	0.619	< 0.173	9540	33.7	7.05	16.9	29600	8.3	7010	372	< 0.0267	< 0.808	19	3440	< 0.118	< 0.404	672	0.602	< 1.9	54.1	66.7
B056HA003	September 23, 1999	4 - 4.5	CL	18900	6.91 J	16.5	79.2	0.719	< 0.183	4110	41.6	8.93	18.5	34600	17.5	8100	198	< 0.0282	< 0.854	21.5	1610	0.488 J	< 0.427	391	0.607	< 4.42 UJ	59.3	68.3
B056HA004	September 23, 1999	0.1 - 0.6	SM	12700		9.84	57.1	0.519	< 0.162	3770	29.3	7.39	25.3	29900	9.06	6240	387	< 0.025	< 0.756	18.9	2400	0.212 J	< 0.378	246	0.619	< 1.78	45.5	73.7
B056SB001	September 17, 1999	0.5 - 1	ML	14800	4.22 J	9.91	124	0.599	0.59 J	13000	37.4	9.96	170	38900	6360	6520	346	0.398	< 0.836	36.1	1820	< 0.122	1.79 J	1800	0.579	276	49.4	746
B056SB001	September 17, 1999	5 - 5.5	CL	19100	7.92 J	9.85	111	0.668	0.891 J	66700 J	52.9	38.3	38.3	45500	7.55	10900	1410	0.059 J	< 0.95	67.4	1530	< 0.139 UJ	< 0.475	969	0.802	< 2.24	55.8	71.6
B056SB002	September 16, 1999	3 - 3.5	CL	26100		15.9	47.5	0.549	0.553 J	48200	74.5	9.09	44.1	40100	12.5	13300	216	0.037 J	< 0.965	64.7	2050	< 0.141	< 0.483	1860	0.577 J	< 2.27	52.7	86.3
B056SB002	September 16, 1999	9.5 - 10	CL	22300		2.63	70.4	0.704	0.334 J	14200	58	12.7	52.4	45600	12	10400	835	< 0.0311	< 0.942	78.4	2010	< 0.138	1.31 J	660	0.502 J	< 2.22	77.7	86.3
B056SB003	September 17, 1999	0.5 - 1	CL	26800		9.92	120	0.715	< 0.199	27300	71.4	8.73	57.8	50000	9.73	13400	195	0.067 J	< 0.929	65.1	1520	< 0.136	0.533 J	1570	0.934	< 2.52 UJ	78.9	82.1
B056SB003	September 17, 1999	5 - 5.5	CL	24600		10.9	55.3	0.485	< 0.215	4620	65.2	10.1	56.8	37700	7.39	10700	202	< 0.0332	< 1.01	68	1800	< 0.147	0.818 J	918	0.702	< 2.37	77.3	80.2
B056SB004	September 15, 1999	1 - 2	ML	14700		11.7	74.3	0.582	0.231 J	35900	34.2	8.13	107	29100	36.9	7260	503	0.16	< 0.779	22.5	2180	< 0.114	< 0.39	670	0.493	< 1.84	57.9	101
B056SB004	September 15, 1999	5.5 - 6.5	ML	23400		6.08	52.3	0.605	< 0.207	8720	61.5	18.6	55.3	39800	10.3	10900	330	0.081 J	< 0.967	66.6	1490	< 0.142	< 0.483	973	0.576 J	< 2.28	78.3	82.3
B056SB004	September 15, 1999	8.5 - 9.5	ML	18400		3.78	82	0.51	< 0.191	8050	45.9	33.8	42.1	29600	9.08	9450	1010	0.076 J	< 0.891	74.5	1460	< 0.131	< 0.446	694	0.543	< 3.15 UJ	44.1	73.2
B057AHP001	September 13, 1999	3.5 - 4	SM	12800		4.7	44	0.724	< 0.176	5590	29.9	16.3	12	22900	7.09	5850	244	0.032 J	< 0.821	28.8	1440	< 0.12	< 0.41	275	0.507	< 1.93	48	62
B057AHP001	September 13, 1999	10 - 10.5	SM	12700		7.82	53.1	0.581	< 0.162	3260	29.7	8.27	12.4	28200	6.54	6120	211	0.0251 J	< 0.759	15.4	2590	0.347 J	< 0.379	320	0.629	< 3.16 UJ	52.1	64.9
B057AHP001	September 13, 1999	20 - 20.5	SM	14900		7.53	55.1	0.617	< 0.18	3300	36.6	7.1	13.5	33200	7.06	7330	261	0.038 J	< 0.84	14.3 J	2900	0.816 J	< 0.42	316	0.589	< 2.91 UJ	56.3	66.1
B057AHP002	September 15, 1999	1 - 2	CL	18900	13.1 J	9.77	102	0.806	1.38	3070	37.1	7.2	792	37700	369	5420	417	0.713	< 0.83	29.4	2240	0.161 J	0.931 J	205	0.634	28.3	55.1	2440
B057AHP002	September 15, 1999	5.5 - 6.5	SM	18100	< 4.01 UJ	8.2	74.2	0.795	< 0.174	3410	40.1	7.37	11.1	36800	7.88	7800	281	< 0.0268	< 0.812	20.8	2290	< 0.119	< 0.406	208	0.688	< 1.91	55.7	63.6
B057AHP002	September 15, 1999	10.5 - 11.5	SM	13900	< 3.76 UJ	9.8	68	0.537	0.165 J	44900	29.2	7.3	10.5	29100	6.63	6730	246	< 0.0251	< 0.76	16.2	2310	< 0.111	< 0.38	242	0.724	< 3.87 UJ	43	60.1
B057AHP002	September 15, 1999	20.5 - 21.5	SM	16300	< 3.7 UJ	14.2	58	0.665	< 0.16	8340	37.9	7.8	14.7	28100	8.3	7750	240	0.029 J	< 0.749	19.4	3000	0.219 J	< 0.375	510	0.434 J	< 1.77 UJ	59.9	73.5
B057AHP003	September 14, 1999	5 - 5.5	ML	11400		7.72	32.8	0.538	< 0.185	2620	27.5	8.16	20	24200	5.94 J	5380	242	0.06 J	< 0.862	24.5	1690	< 0.126	< 0.431	658	0.431 J	< 2.54 UJ	50	49.2
B057AHP003	September 14, 1999	10 - 10.5	SM	12400		14.1	36.7	0.588	< 0.172	27100	25.2	6.56	11.1	29900	6.05	6390	468	0.042 J	< 0.802	15.8	1960	0.135 J	< 0.401	347	0.511	< 1.89	51.4	49.4

Table 6-11. Detected Analytes in Soil
Metals (mg/kg), 50 Series Complex
(Page 2 of 2)

Location-ID	Sample Date	Depth (feet)	Soil Code	ALUMINUM	ANTIMONY	ARSENIC	BARIUM	BERYLLIUM	CADMIUM	CALCIUM	CHROMIUM	COBALT	COPPER	IRON	LEAD	MAGNESIUM	MANGANESE	MERCURY	MOLYBDENUM	NICKEL	POTASSIUM	SELENIUM	SILVER	SODIUM	THALLIUM	TIN	VANADIUM	ZINC
B057AHP003	September 14, 1999	20.5 - 21	SM	14800		8.8	60.6	0.613	< 0.202	3090	36.5	7.63	13.4	32000	8.46	8100	252	0.039 J	< 0.944	13.2 J	3020	0.27 J	< 0.472	442	0.552 J	< 2.28 UJ	60.5	60.2
B057AHP004	September 13, 1999	3 - 3.5	ML	14200		19.2	70.2	0.613	0.907 J	3690	33.8	9.24	19	31800	35.1	6700	552	0.066 J	< 0.817	22.5	2840	0.352 J	< 0.408	265	0.632	< 1.92	54.9	78.8
B057AHP005	September 10, 1999	3.5 - 4	ML	13000		7.72	390	0.6	0.0984 J	16000	28	13	26	26000	7.14	6300	590	< 0.028	1 J	32	1400	< 0.22 UJ	< 0.42	440	0.526	< 4.8 UJ	49	75
B057AHP006	September 9, 1999	2.5 - 3	ML	13000	6.67 J	6.15 J	110	0.6	0.192 J	11000	79 J	14	25	28000	16.7	15000 J	510	0.157	1.2 J	110 J	1700 J	< 0.21 UJ	< 0.4	210	0.509	< 4.5 UJ	36	77
B057AHP007	September 14, 1999	3.5 - 4	ML	16100		9.16	72.6	0.543	< 0.181	10200	41.8	6.51	26	30900	8.17	6270	161	0.049 J	< 0.848	22	2110	0.198 J	< 0.424	471	0.651	< 2	55.6	50.5
B057AHP007	September 14, 1999	9.5 - 10	SM	16000		12.7	63.1	0.726	< 0.165	3090	38.5	10.6	13.1	43000	6.97	6900	245	0.033 J	< 0.772	23.3	2330	0.186 J	< 0.386	684	0.68	< 1.82	57.9	62.4
B057AHP007	September 14, 1999	19.5 - 20	SM	13600		8.78	47.6	0.702	0.212 J	2530	32.6	9.42	11.9	56100	6.64	6280	258	0.039 J	< 0.764	23	2820	0.216 J	< 0.382	381	0.623	< 1.8	51	64.6
B057AHP008	September 16, 1999	3.5 - 4	ML	949	< 3.79 UJ	0.388	16.5	0.0399 J	< 0.164	3300	2.69	0.444 J	0.799 J	1170	< 0.421 UJ	219	34.9	< 0.0254	< 0.767	1.23 J	199 J	< 0.112	< 0.384	237	< 0.0706	< 1.81	2.22 J	1.86 J
B057ASB001	September 16, 1999	3.5 - 4	CL	21300		15.2	197	0.638	< 0.192	17100	53.6	12.7	32.2	37100	10.6	6090	433	0.229	< 0.898	53.8	1970	< 0.132	< 0.449	1150	0.634	< 3.49 UJ	67.1	52.8
B057ASB001	September 16, 1999	11.5 - 12	CL	22200		7.8	175	0.717	< 0.19	4830	56.2	20.2	36.2	32500	8.25	6620	567	< 0.0293	< 0.887	56.8	2080	< 0.13	0.491 J	1370	0.625	< 3.13 UJ	61.6	53.3
B057ASB001	September 16, 1999	19.5 - 20	CL	14200		9.69	73	0.505	0.257 J	10000	34.4	14.3	31.5	36300	6.7	7630	591	< 0.0295	< 0.892	47.8	2200	< 0.131	< 0.446	594	0.689	< 2.1	55.3	56
B057BHA001	September 21, 1999	1 - 1.5	CL	21300		8.96	154	0.665	< 0.184	3960	43.2	11	28.6	30800	10.1	6160	443	< 0.0284	< 0.86	39	2340	< 0.126	< 0.43	232	0.621	< 2.03	58.8	58.8
B057BHA001	September 21, 1999	4 - 4.5	CL	26200		10.6	136	0.615	< 0.2	26500	55	11.8	53.8	39200	8.57	13200	296	< 0.0308	< 0.933	71.4	1480	< 0.137	< 0.466	385	0.621	< 2.2	66.7	74.1
B057HA001A	September 22, 1999	0.1 - 0.3	ML		2960 J	7.95							69600		139000													
B057HA001B	September 22, 1999	0.2 - 0.3	ML	4260	3040 J	8.49	46.5	0.104	1.19	655	22.9	7.64	139000	78100	141000	2620	771	0.82	< 0.708	27	617 J	< 0.104	< 0.354	130	1.04	< 1.67	5.17 J	15000
B057HA002A	September 22, 1999	0.1 - 0.2	ML		991 J	14							11900		69900													
B057HA002B	September 22, 1999	0.1 - 0.2	ML		3960 J	45.2							103000		95700													
B057HA003A	September 22, 1999	0.1 - 0.2	ML			4.01							198000		151000													
B057HA003B	September 22, 1999	0.1 - 0.2	ML			4.59							176000		145000													
B057HA004	September 21, 1999	0.1 - 0.6	SM		6.57 J	8.93							24.6		22.2													
B057HA005	September 21, 1999	0.3 - 0.8	ML		4.74 J	11.7							39.2		120													
B057HA005	September 21, 1999	4 - 4.5	CH		< 4.94 UJ	23.9							57.9		9.24													
B065BHA002	September 8, 1999	0.5 - 1	ML		8.32 J	44.5							84		481													
B065BHA002	September 8, 1999	4.5 - 5	ML		< 3.99 UJ	10.2							22		30.6													
B065BHA002	September 8, 1999	9.5 - 10	CL		< 4.34 UJ										15.2													
B065BHA003	September 8, 1999	1 - 1.5	ML		8.71 J										550													
B065BHA003	September 8, 1999	3 - 3.5	ML		8.45 J										164													
B065BHA004	September 8, 1999	2 - 2.5	ML	17000	4.19 J	12.4	100	0.61	0.501 J	11000	40	9.4	34	30000	276	6200	370	0.379	< 1.9 UJ	24	2500	< 0.26 UJ	< 0.41	470	0.539	< 4.8 UJ	63	150
B065BHA004	September 8, 1999	5.5 - 6	ML	15000	< 3.84 UJ	8.4	65	0.59	0.157 J	37000	35	7.3	11	26000	6.79	7000	700	< 0.0256	< 0.78	16	2400	< 0.11	< 0.39	230	0.519	< 3.8 UJ	51	61
B066ASB001	September 14, 1999	0.5 - 1	SM	10600	< 3.74 UJ	7.92	42.7	0.48	< 0.162	24900	31.4	7.17	9.54	21100	6.59	5060	292	0.0403 J	< 0.757	15.9	1780	< 0.111	< 0.378	165	0.335 J	< 2 UJ	43.7	51.1
B066ASB001	September 14, 1999	4.5 - 5	SM	15700	< 3.76 UJ	9.72	63.7	0.619	< 0.163	15100	36.8	7.86	14.6	32200	7.96	7210	232	0.037 J	< 0.761	21	2500	0.153 J	< 0.381	219	0.599	< 1.79	54.2	70.1
B066ASB001	September 14, 1999	9.5 - 10	SM	14700		6.97	62.7	0.609	< 0.163	9410	34.5	7.46	13.9	30100	7.75	6880	208	0.036 J	< 0.763	20.5	2460	0.167 J	< 0.382	186	0.546	< 1.8	49.7	68.5
B120SB001	September 17, 1999	4.5 - 5	CL												12			0.074 J										
B120SB002	September 17, 1999	4 - 4.5	CL												31.7			0.074 J										

Number of Detects:	65	22	77	65	64	28	65	65	65	78	65	88	65	65	35	4	65	64	28	15	65	64	8	65	64
Total Number of Analyses:	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89
Minimum Concentration:	356	4.19	0.388	16.5	0.0399	0.0868	655	2.69	0.444	0.799	1170	3.69	219	34.9	0.0251	1	1.23	199	0.135	0.491	130	0.186	19	2.22	1.86
Maximum Concentration:	26800	3960	65.2	390	0.806	82.6	66700	266	38.3	198000	78100	151000	15000	1410	10.4	38.6	246	3440	1.22	2.38	15800	1.04	276	78.9	15000
Mean Detected Concentration:	15506	506.73	11.484	84.6	0.5752	3.5562	12317	43.60	10.197	9056.249	33027	8623.02	7059	379.6	0.5030	18	37.14	2132	0.346	0.973	782	0.593	93	51.50	396.17

QUALIFIER LEGEND:

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
U The analyte was not detected above the reported sample quantitation limit.
UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

Table 6-12. Detected Analytes in Water
Metals (mg/L), 50 Series Complex

Location-ID	Sample Date	Depth (feet)	ALUMINUM	ANTIMONY	ARSENIC	BARIUM	CALCIUM	CHROMIUM	CHROMIUM, HEXAVALENT	COPPER	IRON	LEAD	MAGNESIUM	MANGANESE	MOLYBDENUM	NICKEL	POTASSIUM	SELENIUM	SILVER	SODIUM	VANADIUM	ZINC
B053SB002	September 10, 1999	4										0.0022 J										
B053TR001	June 7, 1999	6.5										0.0022 J										
B056SB002	September 17, 1999	9.5	< 0.0463	< 0.0035	0.0021 J	0.0071 J	13.8	0.0123 J	0.011 J	< 0.0027	< 0.0105	< 0.0021	12.9	< 0.0015	< 0.0205 UJ	< 0.0089	< 1.97	< 0.0016	< 0.0045	79.2	0.008 J	< 0.0058
B057AGR001	September 7, 1999	6	0.053 J	< 0.0035	< 0.0018	0.036	13	< 0.0047	< 0.003	0.0035 J	16	< 0.0021	23	0.29	< 0.0093	0.019 J	22	< 0.0016	< 0.0045	270	< 0.0038	0.014 J
B057AHP002	September 16, 1999	17	< 0.0463	< 0.0035	< 0.0018	0.0418	74	< 0.0047	< 0.003	< 0.0027	< 0.0105	< 0.0021	21.1	0.0467	< 0.0168 UJ	< 0.0089	2.47 J	< 0.0016	< 0.0045	209	< 0.0038	< 0.0058
B057AHP003	September 15, 1999	17	< 0.0463	< 0.0035	< 0.0018	0.0298	55.5	< 0.0047	< 0.003	< 0.0027	< 0.0105	< 0.0021	27.2	0.252	< 0.0162 UJ	< 0.0089	2.39 J	< 0.0016	< 0.0045	176 J	< 0.0038	< 0.0058
B057AHP004	September 13, 1999	6	< 0.0463	0.0066 J	0.0033 J	0.0398	53.2	0.0224	0.023 J	0.0032 J	< 0.0105	< 0.0021	22.5	0.0077	< 0.0112 UJ	0.0169 J	3.42 J	0.0018 J	< 0.0045	219	0.0093 J	< 0.0062 UJ
B057AHP005	September 10, 1999	8	< 0.046	< 0.0035	0.067	0.23	150	0.0064 J	< 0.003	0.0063 J	40	< 0.0021	170	2.7	< 0.0093	< 0.0089	45	< 0.0016	0.0047 J	1800	0.0049 J	0.0092 J
B057AHP006	September 9, 1999	6	0.054 J	0.0031 J	0.0025 J	0.095	29	< 0.0047	< 0.003	< 0.0027	0.034 J	< 0.0021	15	0.27	0.01 J	< 0.0089	3.8 J	< 0.0016	< 0.0045	100	< 0.0038	0.0071 J
B057AHP008	September 16, 1999	8	< 0.0463	< 0.0035	0.0171	0.0542	49.6	< 0.0047	< 0.003	0.0074 J	< 0.0105	< 0.0021	9.64	0.0209	< 0.0168 UJ	0.0165 J	10.2	< 0.0016	< 0.0045	361	0.0121 J	< 0.0058
B057HA004	September 28, 1999	0.5	< 0.0697 UJ	0.021 J	0.0058 J	0.0625 J	46.7 J	< 0.0047 UJ	< 0.003	0.0112 J	< 0.0105 UJ	0.023 J	21.2 J	0.158 J	0.0135 J	0.0171 J	8.8 J	< 0.0016 UJ	< 0.0045 UJ	207 J	0.0129 J	0.0184 J
Number of Detects:			2	3	6	9	9	3	2	5	3	3	9	8	2	4	8	1	1	9	5	4
Total Number of Analyses:			11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Minimum Concentration:			0.053	0.0031	0.0021	0.0071	13	0.0064	0.011	0.0032	0.034	0.0022	9.64	0.0077	0.01	0.0165	2.39	0.0018	0.0047	79.2	0.0049	0.0071
Maximum Concentration:			0.054	0.021	0.067	0.23	150	0.0224	0.023	0.0112	40	0.023	170	2.7	0.0135	0.019	45	0.0018	0.0047	1800	0.0129	0.0184
Mean Detected Concentration:			0.054	0.0102	0.0163	0.0662	54	0.0137	0.017	0.0063	18.678	0.0091	35.84	0.4682	0.0118	0.0174	12.26	0.0018	0.0047	380.1	0.0094	0.0122

QUALIFIER LEGEND:

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

7.0 HUMAN HEALTH RISK SCREENING ANALYSIS

This section summarizes the human health risk screening evaluation conducted in support of the investigation at the 50 Series Complex. It includes a description of the procedures used to identify COPCs in soil from the COI list developed as part of the Final Soil Assessment Criteria for the Former Benicia Arsenal (FA/BC, 2002). The FA/BC (2002) document does not analyze COI in soil gas, therefore a screening evaluation of indoor air risk based on soil gas data was performed based on the Johnson and Ettinger (J&E) model for subsurface vapor intrusion into buildings (USEPA, 1991, Revised 2000). Assumptions regarding land and groundwater use, potential receptors, and other aspects of the exposure scenarios used to develop the BSLs are also addressed.

7.1 Background

FA/BC (2002) provided a listing of chemicals that may have been associated with historical operations activities at the former Arsenal. For each of these COIs, calculations based on a variety of exposure scenarios and associated assumptions were used to establish COI concentrations in soil that are unlikely to pose a significant risk of adverse health effects. These concentrations have been termed BSLs. BSLs are comparable to direct contact exposure Risk-Based Screening Levels (RBSLs) developed by the RWQCB.

The objective of this human health risk screening is to analyze and to identify COIs that can be eliminated from further consideration based on a comparison of the maximum concentration of the chemical in soil to the applicable BSLs. Given that BSLs represent COI concentrations in soil that are unlikely to pose a significant risk of adverse health effects, they may be used to decide if additional site investigation is needed or if a NFA decision is warranted. Conversely, maximum concentrations that exceed BSLs indicate that that COI may be a COPC for a particular exposure scenario.

7.2 Land Use

Multiple historical land uses have been identified at the 50 Series Complex, and a variety of locations may have been impacted by chemical releases from former DoD operations. The following activities have been specifically identified as part of previous investigations at the former Arsenal: ordnance storage (supplies, ammunition, small arms parts and accessories); small arms manufacture and testing; manufacture of mobile and seacoast artillery targets; and vehicle maintenance. Since closure in 1964, land use has been predominantly commercial/industrial, although the former Arsenal and surrounding areas also currently support residential and park/open space uses as well. For the purposes of this risk screening evaluation, it was assumed that future land uses of the site and the surrounding properties are expected to be similar to current land uses.

7.3 Potential Exposure Pathways

The following exposure pathways may be complete for current and future land uses at the 50 Series Buildings:

- **Commercial/industrial workers:** incidental ingestion of soil; dermal contact with soil; inhalation of vapors released from subsurface soil to indoor spaces; and inhalation of dust particles and vapors in outdoor air.

- **Construction/utility workers:** incidental ingestion of soil; dermal contact with soil; inhalation of vapors released from subsurface soil to indoor spaces; and inhalation of dust particles and vapors in outdoor air.

- **Residents:** incidental ingestion of soil; dermal contact with soil; inhalation of vapors released from subsurface soil to indoor spaces; and inhalation of dust particles and vapors in outdoor air.

- **Open space visitors:** inhalation of dust particles and vapors released to outdoor air.

A representation of the potentially complete exposure pathways is provided as Figure 7-1.

Inhalation of vapors released from subsurface soil to enclosed indoor spaces may also be a potentially complete exposure pathway for commercial/industrial workers and residents. However, BSLs were not developed for this exposure pathway, and will be evaluated on a site-by-site basis (see Section 7.5.2).

Exposure parameters and other criteria used to develop BSLs, as well as assumptions made in their development, are discussed in the Final Soil Assessment Criteria for the Former Benicia Arsenal (FA/BC, 2002).

7.4 Groundwater Resources

Groundwater at the Arsenal is currently not used as a drinking water source and is not expected to be used as a potable source in the future. Therefore, soil assessment criteria that are protective of groundwater quality were not developed for this risk screening. Groundwater protection will be considered as separate focused evaluations are conducted for specific sites as appropriate.

7.5 Technical Approach

This section describes the technical approach for selection of COPCs and for indoor air evaluations.

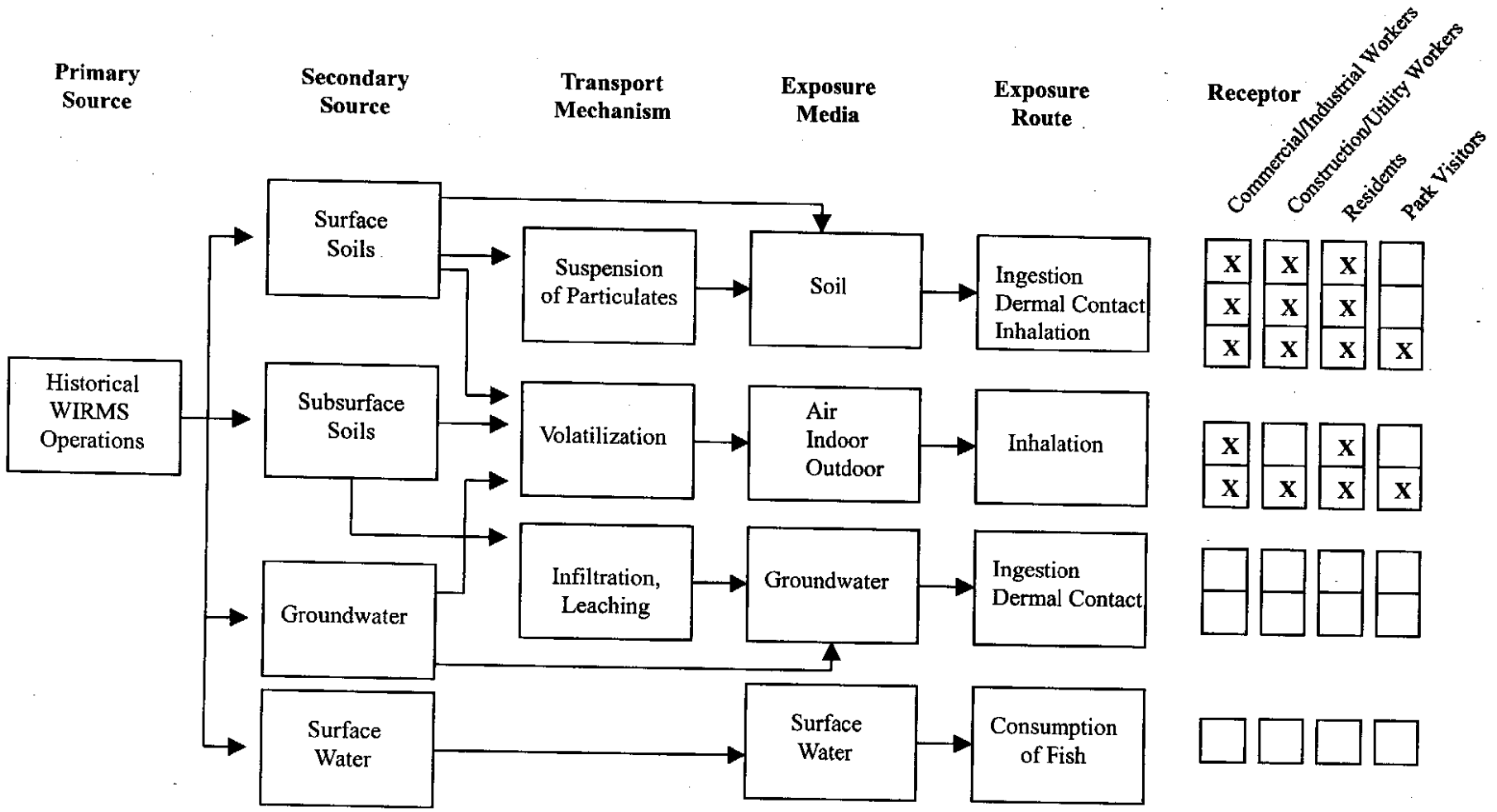


Figure 7-1
Conceptual Exposure Model
Human Health Screening
Area I 50 Series Complex SI Report
Benicia Arsenal, Benicia, CA

7.5.1 *COPC Selection in Soil*

The COPC selection procedure is graphically represented in Figure 7-2.

For VOCs and SVOCS, if the maximum reported concentration exceeds any of the BSLs, then the COI was considered a COPC for the associated exposure scenario. If the maximum VOC or SVOC concentration is less than a BSL, then it is expected that NFA be warranted for that exposure scenario.

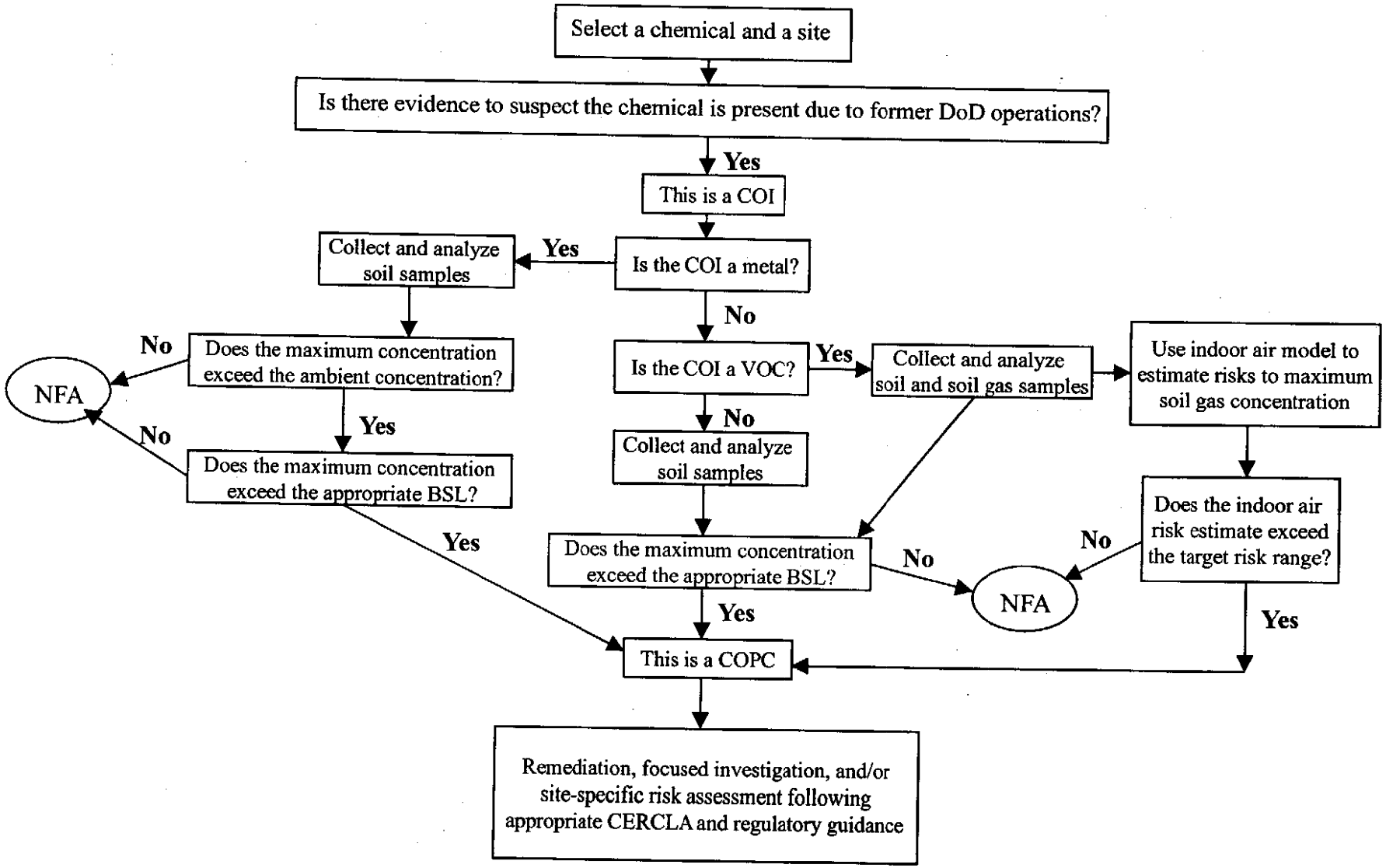
For metals, the COI maximum concentration was first compared with the ambient concentration limits presented in Section 4.9.5. If the maximum concentration of the COI was less than its ambient concentration, then it is expected that NFA be warranted for that COI. If the maximum concentration of the COI exceeded its ambient concentration, it was then compared to the applicable BSLs. If the maximum reported concentration of the COI exceeds any BSL, then the metal was considered a COPC for the associated exposure scenario. If the maximum concentration is less than the BSLs, then it is expected that NFA be warranted for that exposure scenario.

It should be noted that concentrations used for potential future focused investigations would likely use 95th percentile upper confidence limits to be more representative, rather than maximum concentrations.

7.5.2 *Indoor Air Evaluation Approach*

Inhalation of vapors released from subsurface soil to enclosed indoor spaces may be a potentially complete exposure pathway for commercial/industrial workers and residents. To evaluate the potential risk posed by volatilized chemicals intruding into indoor air spaces, maximum concentrations reported in soil gas samples were input into the J&E model. The soil gas samples used for this screening were collected and analyzed by EPA Method TO-14. The version of the J&E model used for this project provided a screening-level description of the processes involved in vapor intrusion from subsurface soils or groundwater into indoor structures.

Data was also input into the model for vadose zone soil type, as well as the approximate depth at which soil samples were collected. Given the variable design in the 50 Series Buildings with respect to substructure construction, two model trials were run for each contaminant. One used a 15 centimeter (cm) enclosed space floor distance below grade, and the second used a 200 cm distance. These values are meant to represent buildings with on-grade slab construction and below-grade basements, respectively. Soil type data was derived from the logged soil interval closest to the depth from which a soil gas sample was collected. Default values were input for all other model parameters. Appendix M provides the input parameters used in the modeling.



COI = Chemical of Interest
VOC = Volatile Organic Compound
BSL = Benicia Screening Level
COPC = Chemical of Potential Concern
NFA = No Further Action

Figure 7-2
COPC Selection Process Flowchart
Human Health Screening
Area I 50 Series Complex SI Report
Benicia Arsenal, Benicia, CA

7.6 Screening Evaluation Results

This section describes the results of the screening evaluation.

7.6.1 *COPC Selection Results in Soil*

The results of COPC selection process are summarized in Table 7-1, which lists all COIs with the maximum reported value from the 50 Series Complex investigation, ambient concentrations (metals only) and BSLs. Maximum reported concentrations that exceed an ambient concentration (metals only) or a BSL are shaded. Based on the screening analysis, the second column lists each COI as either NFA or as a COPC.

A total of 14 organic compounds were detected at concentrations that exceeded at least one of the associated BSLs. Of these, eight COPCs were metals, three were PAHs, one was a VOC, and two were petroleum hydrocarbons. No organic COPCs were associated with any of the open space visitor exposure scenarios.

Table 7-1 also provides the ambient metals concentrations against which the maximum concentrations for metals were compared. Of the total of 21 metals for which ambient concentrations were calculated, maximum reported concentrations exceeded those respective ambient concentrations for the following metals: aluminum, antimony, arsenic, barium, cadmium, chromium (total), cobalt, copper, iron, lead, manganese, mercury, molybdenum, nickel, selenium, silver, thallium, tin and zinc. Metals that exceed ambient concentrations are considered to be COPCs only if they also exceed a BSL. A summary of the COPCs is presented in Table 7-2.

7.6.2 *Indoor Air Evaluation Results*

The incremental risk and hazard quotients derived for indoor air from the input of the maximum soil gas concentration for VOCs into the J&E model are summarized in Table 7-3. In circumstances where sampling depth was less than 200 cm, a default sampling depth of 200 cm was used for the below-grade basement scenario. Actual sampling depths are provided in Table 7-3.

Twenty-four VOCs were detected at least once in soil gas samples collected in support of the 50 Series Complex site investigation. The maximum detection for each of these 24 VOCs is provided in Table 7-3. The 11 VOCs for which chemical and physical data is available in the J&E model were evaluated. The J&E model calculates the cancer risk for carcinogens and the hazard quotient for noncarcinogens due to exposure to each COI in vapor that could migrate into indoor air. The maximum concentration detected for that COI was used as input for the model.

Table 7-1. Chemicals of Potential Concern Selection Summary

Chemical of Interest	COPC/NFA Status	Max Conc (mg/kg)	Ambient Concentration (Metals Only) (mg/kg)	Commercial/Industrial Workers Carcinogens (mg/kg)	Commercial/Industrial Workers Noncarcinogens (mg/kg)	Construction/Utility Workers Carcinogens (mg/kg)	Construction/Utility Workers Noncarcinogens (mg/kg)	Residents Carcinogens[1] (mg/kg)	Adult Residents Noncarcinogens (mg/kg)	Child Residents Noncarcinogens (mg/kg)	Open Space Visitors Carcinogens 1 (mg/kg)	Adult Open Space Vistors Noncarcinogens (mg/kg)	Child Open Space Visitors Noncarcinogens (mg/kg)
1,1,1,2-Tetrachloroethane	NFA	ND	N/A	7.04E+00	1.95E+03	2.46E+02	1.92E+04	3.00E+00	1.35E+03	4.89E+02	3.10E+02	2.52E+04	5.40E+03
1,1,1-Trichloroethane	NFA	ND	N/A	NC	3.22E+03	NC	2.40E+04	NC	2.13E+03	6.35E+02	NC	4.37E+04	9.36E+03
1,1,2,2-Tetrachloroethane	NFA	ND	N/A	9.11E-01	3.91E+03	3.19E+01	3.83E+04	3.89E-01	2.70E+03	9.78E+02	4.01E+01	5.04E+04	1.08E+04
1,1,2-Trichloroethane	NFA	ND	N/A	1.90E+00	1.52E+02	7.30E+01	1.64E+03	8.42E-01	1.07E+02	4.12E+01	8.26E+01	1.94E+03	4.15E+02
1,1-Dichloroethane	NFA	ND	N/A	NC	2.06E+03	NC	2.37E+04	NC	1.46E+03	5.90E+02	NC	2.61E+04	5.58E+03
1,1-Dichloroethene	NFA	ND	N/A	1.19E-01	6.74E+01	4.79E+00	8.16E+02	5.36E-02	4.79E+01	2.01E+01	5.12E+00	8.45E+02	1.81E+02
1,2,3-Trichloropropane	NFA	ND	N/A	3.09E-03	3.86E+01	1.33E-01	4.70E+02	1.43E-03	2.75E+01	1.16E+01	1.32E-01	4.84E+02	1.04E+02
1,2,4-Trichlorobenzene	NFA	2.60E-03	N/A	NC	7.62E+03	NC	2.26E+04	NC	3.96E+03	6.46E+02	NC	1.52E+05	3.25E+04
1,2,4-Trimethylbenzene	NFA	3.20E-02	N/A	NC	1.71E+02	NC	2.10E+03	NC	1.22E+02	5.16E+01	NC	2.14E+03	4.58E+02
1,2-Dibromo-3-Chloropropane	NFA	ND	N/A	3.98E+00	6.92E+00	1.90E+01	5.72E+01	4.53E-01	4.67E+00	1.50E+00	6.40E+03	9.19E+01	1.97E+01
1,2-Dibromoethane	NFA	ND	N/A	4.83E-02	2.62E+00	3.01E-01	2.75E+01	6.87E-03	1.83E+00	6.94E-01	7.30E+00	3.36E+01	7.19E+00
1,2-Dichlorobenzene	NFA	ND	N/A	NC	3.32E+03	NC	3.59E+04	NC	2.33E+03	9.02E+02	NC	4.22E+04	9.05E+03
1,2-Dichloroethane	NFA	ND	N/A	7.65E-01	3.52E+01	3.09E+01	4.38E+02	3.46E-01	2.51E+01	1.07E+01	3.30E+01	4.40E+02	9.44E+01
1,2-Dichloropropane	NFA	ND	N/A	7.68E-01	2.12E+01	3.18E+01	2.46E+02	3.51E-01	1.50E+01	6.10E+00	3.30E+01	2.68E+02	5.75E+01
1,3,5-Trimethylbenzene	NFA	ND	N/A	NC	6.98E+01	NC	8.67E+02	NC	4.98E+01	2.13E+01	NC	8.73E+02	1.87E+02
1,3,5-Trinitrobenzene	NFA	ND	N/A	NC	2.64E+04	NC	4.85E+04	NC	1.57E+04	1.83E+03	NC	2.52E+09	5.40E+08
1,3-Dichlorobenzene	NFA	ND	N/A	NC	5.18E+01	NC	5.21E+02	NC	3.60E+01	1.32E+01	NC	6.66E+02	1.43E+02
1,3-Dinitrobenzene	NFA	ND	N/A	NC	8.81E+01	NC	1.62E+02	NC	5.22E+01	6.11E+00	NC	8.41E+06	1.80E+06
1,4-Dichlorobenzene	NFA	2.00E-03	N/A	8.13E+00	1.21E+04	2.81E+02	5.62E+04	3.44E+00	7.24E+03	1.56E+03	3.59E+02	1.89E+05	4.06E+04
2,3,7,8-Tetrachlorodibenzo-p-Dioxin			N/A	2.73E-05	C	1.46E-04	C	3.89E-06	C	C	5.35E+00	C	C
2,3,7,8-Tetrachlorodibenzofuran			N/A	1.45E+00	C	7.08E-02	C	6.81E-01	C	C	6.17E+01	C	C
2,4,5-Trichlorophenol	NFA	ND	N/A	NC	8.81E+04	NC	1.62E+05	NC	5.22E+04	6.11E+03	NC	8.41E+09	1.80E+09
2,4,6-Trichlorophenol	NFA	ND	N/A	2.24E+02	C	1.47E+03	C	4.41E+01	C	C	7.29E+07	C	C
2,4,6-Trinitrotoluene	NFA	ND	N/A	8.22E+01	4.40E+02	5.39E+02	8.09E+02	1.62E+01	2.61E+02	3.06E+01	2.67E+07	4.20E+07	9.01E+06
2,4-Dichlorophenol	NFA	ND	N/A	NC	2.64E+03	NC	4.85E+03	NC	1.57E+03	1.83E+02	NC	2.52E+08	5.40E+07
2,4-Dimethylphenol	NFA	ND	N/A	NC	1.76E+04	NC	3.24E+04	NC	1.04E+04	1.22E+03	NC	1.68E+09	3.60E+08
2,4-Dinitrophenol	NFA	ND	N/A	NC	1.76E+03	NC	3.24E+03	NC	1.04E+03	1.22E+02	NC	1.68E+08	3.60E+07
2,4-Dinitrotoluene	NFA	ND	N/A	3.63E+00	1.76E+03	2.38E+01	3.24E+03	7.14E-01	1.04E+03	1.22E+02	1.18E+06	1.68E+08	3.60E+07
2,6-Dinitrotoluene	NFA	ND	N/A	3.63E+00	C	2.38E+01	C	7.14E-01	C	C	1.18E+06	C	C
2-Chloronaphthalene	NFA	ND	N/A	NC	2.73E+04	NC	1.40E+05	NC	1.67E+04	3.85E+03	NC	4.09E+05	8.77E+04
2-Chlorophenol	NFA	ND	N/A	NC	2.41E+02	NC	2.51E+03	NC	1.68E+02	6.34E+01	NC	3.09E+03	6.62E+02
2-Chlorotoluene	NFA	ND	N/A	NC	5.68E+02	NC	6.34E+03	NC	4.00E+02	1.58E+02	NC	7.20E+03	1.54E+03
2-Methylphenol	NFA	ND	N/A	NC	4.40E+04	NC	8.09E+04	NC	2.61E+04	3.06E+03	NC	4.20E+09	9.01E+08
2-Nitroaniline	NFA	ND	N/A	NC	5.03E+01	NC	9.24E+01	NC	2.98E+01	3.49E+00	NC	4.80E+06	1.03E+06
2-Nitrotoluene	NFA	ND	N/A	NC	2.03E+03	NC	1.37E+04	NC	1.32E+03	3.67E+02	NC	2.82E+04	6.04E+03
3,3'-Dichlorobenzidine	NFA	ND	N/A	5.48E+00	C	3.59E+01	C	1.08E+00	C	C	1.78E+06	C	C
3-Nitrotoluene	NFA	ND	N/A	NC	2.03E+03	NC	1.37E+04	NC	1.32E+03	3.67E+02	NC	2.82E+04	6.04E+03
4-Chloroaniline	NFA	ND	N/A	NC	3.52E+03	NC	6.47E+03	NC	2.09E+03	2.44E+02	NC	3.36E+08	7.21E+07
4-Methylphenol	NFA	ND	N/A	NC	4.40E+03	NC	8.09E+03	NC	2.61E+03	3.06E+02	NC	4.20E+08	9.01E+07
4-Nitrophenol	NFA	ND	N/A	NC	7.05E+03	NC	1.29E+04	NC	4.17E+03	4.89E+02	NC	6.72E+08	1.44E+08
4-Nitrotoluene	NFA	ND	N/A	NC	2.03E+03	NC	1.37E+04	NC	1.32E+03	3.67E+02	NC	2.82E+04	6.04E+03
Acenaphthene	NFA	ND	N/A	NC	3.84E+04	NC	1.30E+05	NC	2.09E+04	3.68E+03	NC	6.98E+05	1.50E+05
Acetone	NFA	3.80E-01	N/A	NC	6.22E+03	NC	6.16E+04	NC	4.31E+03	1.57E+03	NC	8.02E+04	1.72E+04
Aldrin			N/A	1.45E-01	2.64E+01	9.52E-01	4.85E+01	2.86E-02	1.57E+01	1.83E+00	4.72E+04	2.52E+06	5.40E+05
Alpha BHC			N/A	5.94E-01	C	3.31E+00	C	9.00E-02	C	C	1.27E+05	C	C
Aluminum	NFA	2.68E+04	**2.58E+04**	NC	1.68E+06	NC	1.23E+05	NC	6.59E+05	7.61E+04	NC	1.18E+08	2.52E+07
Aniline	NFA	ND	N/A	4.33E+02	6.15E+03	2.84E+03	8.01E+03	8.52E+01	3.64E+03	4.27E+02	1.41E+08	2.40E+07	5.15E+06
Anthracene	NFA	3.40E-01	N/A	NC	3.90E+05	NC	7.53E+05	NC	1.70E+05	2.19E+04	NC	1.34E+07	2.87E+06
Antimony	**COPC**	3.96E+03	**6.47E+00**	NC	**8.18E+02**	NC	**1.06E+03**	NC	**2.92E+02**	**3.13E+01**	NC	NA	NA
Arsenic	**COPC**	6.52E+01	**1.55E+01**	**2.73E+00**	4.39E+02	**1.20E+01**	6.74E+02	**3.89E-01**	1.96E+02	**2.16E+01**	5.35E+04	NA	NA
Barium	NFA	3.90E+02	**2.01E+02**	NC	1.24E+05	NC	1.20E+04	NC	4.75E+04	5.37E+03	NC	1.18E+07	2.52E+06
Benzene	NFA	1.50E-02	N/A	1.45E+00	2.42E+01	5.80E+01	2.93E+02	6.54E-01	1.72E+01	7.22E+00	6.29E+01	3.04E+02	6.52E+01
Benzo(a)anthracene	NFA	5.10E-01	N/A	2.89E+00	C	2.01E+01	C	6.20E-01	C	C	2.59E+06	C	C
Benzo(a)pyrene	**COPC**	7.50E-01	N/A	**2.89E-01**	C	2.01E+00	C	**6.20E-02**	C	C	2.59E+05	C	C
Benzo(b)fluoranthene	**COPC**	6.50E-01	N/A	2.89E+00	C	2.01E+01	C	**6.20E-01**	C	C	2.59E+06	C	C
Benzo(k)fluoranthene	NFA	7.20E-01	N/A	2.89E+01	C	2.01E+02	C	6.20E+00	C	C	2.59E+07	C	C
Benzoic Acid	NFA	ND	N/A	NC	3.52E+06	NC	6.47E+06	NC	2.09E+06	2.44E+05	NC	3.36E+11	7.21E+10
Benzyl Alcohol	NFA	ND	N/A	NC	2.64E+05	NC	4.85E+05	NC	1.57E+05	1.83E+04	NC	2.52E+10	5.40E+09
Benzyl Butyl Phthalate	NFA	ND	N/A	NC	1.76E+05	NC	3.24E+05	NC	1.04E+05	1.22E+04	NC	1.68E+10	3.60E+09
Beryllium	NFA	8.06E-01	8.29E-01	2.24E+03	3.69E+03	1.10E+02	4.77E+02	1.05E+03	1.39E+03	1.54E+02	9.55E+04	4.79E+05	1.03E+05
Beta BHC			N/A	2.08E+00	C	1.16E+01	C	3.15E-01	C	C	4.46E+05	C	C

Table 7-1. Chemicals of Potential Concern Selection Summary (continued)

Chemical of Interest	COPC/NFA Status	Max Conc (mg/kg)	Ambient Concentration (Metals Only) (mg/kg)	Commercial/Industrial Workers Carcinogens (mg/kg)	Commercial/Industrial Workers Noncarcinogens (mg/kg)	Construction/Utility Workers Carcinogens (mg/kg)	Construction/Utility Workers Noncarcinogens (mg/kg)	Residents Carcinogens[1] (mg/kg)	Adult Residents Noncarcinogens (mg/kg)	Child Residents Noncarcinogens (mg/kg)	Open Space Visitors Carcinogens 1 (mg/kg)	Adult Open Space Vistors Noncarcinogens (mg/kg)	Child Open Space Visitors Noncarcinogens (mg/kg)
Bis(2-Chloroethyl) Ether	NFA	ND	N/A	5.99E-01	C	1.34E+01	C	2.06E-01	C	C	2.89E+01	C	C
Bis(2-Chloroisopropyl) Ether	NFA	ND	N/A	8.08E+00	4.25E+03	1.95E+02	3.67E+04	2.88E+00	2.89E+03	9.54E+02	3.82E+02	5.60E+04	1.20E+04
Bis(2-Ethylhexyl) Phthalate	NFA	1.10E+00	N/A	1.76E+02	1.76E+04	1.16E+03	3.24E+04	3.47E+01	1.04E+04	1.22E+03	5.73E+07	1.85E+09	3.96E+08
Bromobenzene	NFA	3.50E-03	N/A	NC	9.24E+01	NC	1.13E+03	NC	6.58E+01	2.78E+01	NC	1.16E+03	2.48E+02
Bromodichloromethane	NFA	1.90E-03	N/A	2.36E+00	1.04E+03	8.63E+01	1.07E+04	1.02E+00	7.27E+02	2.71E+02	1.03E+02	1.34E+04	2.87E+03
Bromoform	NFA	ND	N/A	3.12E+02	1.76E+04	2.07E+03	3.24E+04	6.15E+01	1.04E+04	1.22E+03	2.08E+08	1.68E+09	3.60E+08
Bromomethane	NFA	ND	N/A	NC	1.29E+01	NC	1.55E+02	NC	9.16E+00	3.82E+00	NC	1.62E+02	3.46E+01
Cadmium	**COPC**	8.26E+01	**8.70E-01**	2.99E+03	1.01E+03	1.46E+02	1.32E+03	1.40E+03	3.64E+02	**3.90E+01**	1.27E+05	NA	NA
Carbon Disulfide	NFA	9.60E-03	N/A	NC	1.21E+03	NC	1.44E+04	NC	8.58E+02	3.55E+02	NC	1.52E+04	3.26E+03
Carbon Tetrachloride	NFA	1.80E-03	N/A	5.24E-01	7.00E+00	2.12E+01	8.39E+01	2.37E-01	4.97E+00	2.07E+00	2.26E+01	8.79E+01	1.88E+01
Chlordane (Alpha)			N/A	1.07E+01	6.69E+02	5.96E+01	1.01E+03	1.62E+00	3.15E+02	3.52E+01	2.29E+06	1.68E+07	3.60E+06
Chlordane (Gamma)			N/A	1.07E+01	6.69E+02	5.96E+01	1.01E+03	1.62E+00	3.15E+02	3.52E+01	2.29E+06	1.68E+07	3.60E+06
Chlorobenzene	NFA	ND	N/A	NC	5.43E+02	NC	6.09E+03	NC	3.83E+02	1.52E+02	NC	6.88E+03	1.47E+03
Chloroethane	NFA	ND	N/A	6.51E+00	1.89E+04	2.82E+02	1.97E+05	3.03E+00	1.32E+04	4.98E+03	2.78E+02	2.42E+05	5.18E+04
Chloroform	NFA	7.50E-03	N/A	5.18E-01	1.29E+00	2.30E+01	1.61E+01	2.43E-01	9.21E-01	3.94E-01	2.21E+01	1.61E+01	3.45E+00
Chloromethane	NFA	ND	N/A	2.66E+00	5.18E+02	1.13E+02	6.48E+03	1.23E+00	3.70E+02	1.59E+02	1.14E+02	6.48E+03	1.39E+03
Chromium, Total	**COPC**	2.66E+02	**7.55E+01**	4.48E+02	C	**2.19E+01**	C	**2.11E+02**	C	C	1.91E+04	C	C
Chrysene	NFA	6.80E-01	N/A	2.82E+02	C	2.02E+03	C	6.14E+01	C	C	5.36E+05	C	C
Cis-1,2-Dichloroethylene	NFA	6.60E-01	N/A	NC	1.47E+02	NC	1.73E+03	NC	1.05E+02	4.29E+01	NC	1.86E+03	3.98E+02
Cis-1,3-Dichloropropene	NFA	ND	N/A	1.61E+00	4.74E+01	5.80E+01	5.88E+02	6.95E-01	3.38E+01	1.44E+01	7.08E+01	5.93E+02	1.27E+02
Cobalt	NFA	3.83E+01	**1.29E+01**	NC	1.23E+05	NC	1.60E+05	NC	4.38E+04	4.69E+03	NC	NA	NA
Copper	**COPC**	1.98E+05	**3.33E+01**	NC	**7.58E+04**	NC	**9.87E+04**	NC	**2.71E+04**	**2.90E+03**	NC	NA	NA
Cyanide			N/A	NC	4.06E+04	NC	3.18E+04	NC	1.45E+04	1.56E+03	NC	7.20E+07	1.54E+07
Dibenz(a,h)anthracene	**COPC**	4.50E-01	N/A	**2.89E-01**	C	2.01E+00	C	**6.20E-02**	C	C	2.59E+05	C	C
Dibenzofuran	NFA	ND	N/A	NC	5.06E+03	NC	1.00E+04	NC	2.23E+03	2.91E+02	NC	1.66E+05	3.56E+04
Dibromochloromethane	NFA	ND	N/A	2.65E+00	1.59E+03	8.87E+01	1.49E+04	1.11E+00	1.09E+03	3.83E+02	1.18E+02	2.07E+04	4.44E+03
Dibromomethane (1,2)	NFA	ND	N/A	NC	C	NC	C	NC	C	C	NC	C	C
Dichlorodifluoromethane	NFA	ND	N/A	NC	3.08E+02	NC	3.82E+03	NC	2.19E+02	9.36E+01	NC	3.85E+03	8.24E+02
Dieldrin			N/A	1.54E-01	4.40E+01	1.01E+00	8.09E+01	3.03E-02	2.61E+01	3.06E+00	5.01E+04	4.20E+06	9.01E+05
Diethyl Phthalate	NFA	ND	N/A	NC	7.05E+05	NC	1.29E+06	NC	4.17E+05	4.89E+04	NC	6.72E+10	1.44E+10
Dimethyl Phthalate	NFA	ND	N/A	NC	8.81E+06	NC	1.62E+07	NC	5.22E+06	6.11E+05	NC	8.41E+11	1.80E+11
Di-n-Butyl Phthalate	NFA	ND	N/A	NC	2.04E+05	NC	2.59E+05	NC	7.30E+04	7.82E+03	NC	8.41E+09	1.80E+09
Di-n-Octylphthalate	NFA	ND	N/A	NC	1.76E+04	NC	3.24E+04	NC	1.04E+04	1.22E+03	NC	1.68E+09	3.60E+08
Endosulfan (Alpha)			N/A	NC	5.29E+03	NC	9.71E+03	NC	3.13E+03	3.67E+02	NC	5.04E+08	1.08E+08
Endosulfan (Beta)			N/A	NC	5.29E+03	NC	9.71E+03	NC	3.13E+03	3.67E+02	NC	5.04E+08	1.08E+08
Endosulfan Sulfate			N/A	NC	5.29E+03	NC	9.71E+03	NC	3.13E+03	3.67E+02	NC	5.04E+08	1.08E+08
Endrin			N/A	NC	2.64E+02	NC	4.85E+02	NC	1.57E+02	1.83E+01	NC	2.52E+07	5.40E+06
Ethyl Methacrylate	NFA	ND	N/A	NC	6.98E+02	NC	8.45E+03	NC	4.97E+02	2.08E+02	NC	8.76E+03	1.88E+03
Ethylbenzene	NFA	1.60E-02	N/A	NC	5.97E+03	NC	5.97E+04	NC	4.15E+03	1.52E+03	NC	7.69E+04	1.65E+04
Fluoranthene	NFA	9.90E+00	N/A	NC	3.01E+04	NC	5.82E+04	NC	1.92E+04	2.29E+03	NC	3.36E+09	7.21E+08
Fluorene	NFA	7.50E-01	N/A	NC	3.31E+04	NC	9.23E+04	NC	1.68E+04	2.64E+03	NC	6.96E+05	1.49E+05
Gamma BHC (Lindane)			N/A	2.88E+00	4.01E+02	1.61E+01	6.26E+02	4.36E-01	1.89E+02	2.11E+01	6.17E+05	2.52E+07	5.40E+06
Heptachlor			N/A	5.48E-01	4.40E+02	3.59E+00	8.09E+02	1.08E-01	2.61E+02	3.06E+01	1.74E+05	4.20E+07	9.01E+06
Heptachlor Epoxide			N/A	2.71E-01	1.15E+01	1.78E+00	2.10E+01	5.33E-02	6.78E+00	7.94E-01	8.82E+04	1.09E+06	2.34E+05
Hexachlorobenzene	NFA	ND	N/A	1.54E+00	7.05E+02	1.01E+01	1.29E+03	3.03E-01	4.17E+02	4.89E+01	5.01E+05	6.72E+07	1.44E+07
Hexachlorobutadiene	NFA	1.80E-03	N/A	3.16E+01	2.64E+02	2.07E+02	4.85E+02	6.22E+00	1.57E+02	1.83E+01	1.03E+07	2.52E+07	5.40E+06
Hexachlorocyclopentadiene	NFA	ND	N/A	NC	5.90E+03	NC	1.59E+03	NC	3.52E+03	4.23E+02	NC	1.68E+06	3.60E+05
Hexachloroethane	NFA	ND	N/A	1.76E+02	8.81E+02	1.16E+03	1.62E+03	3.47E+01	5.22E+02	6.11E+01	5.73E+07	8.41E+07	1.80E+07
Hexahydro-1,3,5-Trinitro-1,3,5-Triazine	NFA	ND	N/A	2.24E+01	2.64E+03	1.47E+02	4.85E+03	4.41E+00	1.57E+03	1.83E+02	7.29E+06	2.52E+08	5.40E+07
Indeno(1,2,3-c,d)pyrene	NFA	5.10E-01	N/A	2.89E+00	C	2.01E+01	C	6.20E-01	C	C	2.59E+06	C	C
Iron	**COPC**	7.81E+04	**5.26E+04**	NC	6.13E+05	NC	7.98E+05	NC	2.19E+05	**2.35E+04**	NC	NA	NA
Isophorone	NFA	ND	N/A	2.60E+03	1.76E+05	1.70E+04	3.24E+05	5.11E+02	1.04E+05	1.22E+04	8.45E+08	1.68E+10	3.60E+09
Isopropylbenzene (Cumene)	NFA	ND	N/A	NC	5.22E+02	NC	6.39E+03	NC	3.72E+02	1.57E+02	NC	6.54E+03	1.40E+03
Lead[2]	**COPC**	1.51E+05	**1.80E+01**	NC	**7.50E+02**	NC	NA	NC	NA	**4.00E+02**	NA	NA	NA
m,p-Xylene (Sum of Isomers)	NFA	4.40E-02	N/A	NC	4.45E+03	NC	5.49E+04	NC	3.18E+03	1.35E+03	NC	5.58E+04	1.20E+04
Manganese	**COPC**	1.41E+03	**1.07E+03**	NC	3.23E+04	NC	**1.26E+03**	NC	1.39E+04	1.76E+03	NC	1.18E+06	2.52E+05
Mercury	NFA	1.04E+01	**2.87E-01**	NC	6.13E+02	NC	7.98E+02	NC	2.19E+02	2.35E+01	NC	NA	NA
Methoxychlor	NFA		N/A	NC	4.40E+03	NC	8.09E+03	NC	2.61E+03	3.06E+02	NC	4.20E+08	9.01E+07

Table 7-1. Chemicals of Potential Concern Selection Summary (continued)

Chemical of Interest	COPC/NFA Status	Max Conc (mg/kg)	Ambient Concentration (Metals Only) (mg/kg)	Commercial/Industrial Workers Carcinogens (mg/kg)	Commercial/Industrial Workers Noncarcinogens (mg/kg)	Construction/Utility Workers Carcinogens (mg/kg)	Construction/Utility Workers Noncarcinogens (mg/kg)	Residents Carcinogens[1] (mg/kg)	Adult Residents Noncarcinogens (mg/kg)	Child Residents Noncarcinogens (mg/kg)	Open Space Visitors Carcinogens 1 (mg/kg)	Adult Open Space Vistors Noncarcinogens (mg/kg)	Child Open Space Visitors Noncarcinogens (mg/kg)
Methyl Ethyl Ketone (2-Butanone)	NFA	1.20E-01	N/A	NC	2.77E+04	NC	2.90E+05	NC	1.94E+04	7.33E+03	NC	3.55E+05	7.60E+04
Methyl Isobutyl Ketone (4-Methyl-2-Pentanone)	NFA	1.10E-01	N/A	NC	2.89E+03	NC	3.14E+04	NC	2.03E+03	7.88E+02	NC	3.68E+04	7.89E+03
Methylene Chloride	NFA	9.90E-03	N/A	2.11E+01	9.77E+03	7.61E+02	7.25E+04	9.10E+00	6.47E+03	1.92E+03	9.24E+02	1.33E+05	2.84E+04
Molybdenum	NFA	3.86E+01	**2.51E+00**	NC	1.02E+04	NC	1.33E+04	NC	3.65E+03	3.91E+02	NC	NA	NA
Naphthalene	NFA	3.60E-01	N/A	NC	1.89E+02	NC	2.27E+03	NC	1.34E+02	5.59E+01	NC	2.37E+03	5.07E+02
N-Butylbenzene	NFA	ND	N/A	NC	5.64E+02	NC	5.70E+03	NC	3.92E+02	1.45E+02	NC	7.25E+03	1.55E+03
Nickel	NFA	2.46E+02	**3.83E+01**	NC	4.09E+04	NC	5.32E+04	NC	1.46E+04	1.56E+03	NC	NA	NA
Nitrobenzene	NFA	ND	N/A	NC	1.14E+02	NC	7.29E+02	NC	7.35E+01	1.96E+01	NC	1.61E+03	3.45E+02
N-Nitrosodimethylamine	NFA	ND	N/A	4.84E-02	C	3.17E-01	C	9.52E-03	C	C	1.64E+04	C	C
N-Nitrosodi-n-propylamine	NFA	ND	N/A	3.52E-01	C	2.31E+00	C	6.94E-02	C	C	2.22E+00	C	C
N-Nitrosodiphenylamine	NFA	ND	N/A	5.03E+02	C	3.30E+03	C	9.91E+01	C	C	1.64E+08	C	C
N-Propylbenzene	NFA	ND	N/A	NC	5.64E+02	NC	5.70E+03	NC	3.92E+02	1.45E+02	NC	7.25E+03	1.55E+03
o-Xylene	NFA	9.00E-04	N/A	NC	4.45E+03	NC	5.49E+04	NC	3.18E+03	1.35E+03	NC	5.58E+04	1.20E+04
p,p'-DDD			N/A	1.71E+01	C	9.14E+01	C	2.43E+00	C	C	3.34E+06	C	C
p,p'-DDE			N/A	1.21E+01	C	6.45E+01	C	1.72E+00	C	C	2.36E+06	C	C
p,p'-DDT			N/A	1.21E+01	7.32E+02	6.45E+01	1.10E+03	1.72E+00	3.26E+02	3.61E+01	2.36E+06	4.20E+07	9.01E+06
PCB-1016 (Arochlor 1016)	NFA	ND	N/A	2.87E+01	5.02E+01	2.01E+02	9.85E+01	6.33E+00	3.28E+01	3.93E+00	1.15E+07	5.88E+06	1.26E+06
PCB-1221 (Arochlor 1221)	NFA	ND	N/A	1.00E+00	C	7.03E+00	C	2.21E-01	C	C	4.01E+05	C	C
PCB-1232 (Arochlor 1232)	NFA	ND	N/A	1.00E+00	C	7.03E+00	C	2.21E-01	C	C	4.01E+05	C	C
PCB-1242 (Arochlor 1242)	NFA	ND	N/A	1.00E+00	C	7.03E+00	C	2.21E-01	C	C	4.01E+05	C	C
PCB-1248 (Arochlor 1248)	NFA	ND	N/A	1.00E+00	C	7.03E+00	C	2.21E-01	C	C	4.01E+05	C	C
PCB-1254 (Arochlor 1254)	NFA	ND	N/A	1.00E+00	1.44E+01	7.03E+00	2.81E+01	2.21E-01	9.37E+00	1.12E+00	4.01E+05	1.68E+06	3.60E+05
PCB-1260 (Arochlor 1260)	NFA	ND	N/A	1.00E+00	C	7.03E+00	C	2.21E-01	C	C	4.01E+05	C	C
Pentachlorophenol	NFA	ND	N/A	1.11E+01	1.43E+04	8.63E+01	3.11E+04	2.97E+00	1.10E+04	1.38E+03	6.69E+06	2.52E+09	5.40E+08
Phenol	NFA	ND	N/A	NC	5.29E+05	NC	9.71E+05	NC	3.13E+05	3.67E+04	NC	5.04E+10	1.08E+10
Pyrene	NFA	1.00E+00	N/A	NC	5.42E+04	NC	7.88E+04	NC	2.06E+04	2.31E+03	NC	5.86E+06	1.26E+06
Sec-Butylbenzene	NFA	ND	N/A	NC	4.16E+02	NC	4.42E+03	NC	2.91E+02	1.11E+02	NC	5.31E+03	1.14E+03
Selenium	NFA	1.22E+00	**6.09E-01**	NC	1.02E+04	NC	1.33E+04	NC	3.65E+03	3.91E+02	NC	NA	NA
Silver	NFA	2.38E+00	**1.67E+00**	NC	1.02E+04	NC	1.33E+04	NC	3.65E+03	3.91E+02	NC	NA	NA
Styrene	NFA	ND	N/A	NC	2.04E+04	NC	1.79E+05	NC	1.39E+04	4.64E+03	NC	2.69E+05	5.76E+04
Tert-Butyl Methyl Ether	NFA	ND	N/A	3.69E+01	C	1.50E+03	C	1.67E+01	C	C	1.59E+03	C	C
Tert-Butylbenzene	NFA	ND	N/A	NC	5.03E+02	NC	5.19E+03	NC	3.51E+02	1.31E+02	NC	6.45E+03	1.38E+03
Tetrachloroethylene	NFA	4.70E-03	N/A	1.89E+01	1.70E+03	3.41E+02	1.24E+04	5.72E+00	1.12E+03	3.29E+02	9.72E+02	2.32E+04	4.98E+03
Thallium	NFA	1.04E+00	**8.50E-01**	NC	1.35E+02	NC	1.76E+02	NC	4.82E+01	5.16E+00	NC	NA	NA
Tin	NFA	2.76E+02	**1.90E+01**	NC	1.23E+06	NC	1.60E+06	NC	4.38E+05	4.69E+04	NC	NA	NA
Toluene	NFA	8.70E-03	N/A	NC	1.99E+03	NC	2.38E+04	NC	1.41E+03	5.88E+02	NC	2.50E+04	5.35E+03
Toxaphene			N/A	2.24E+00	C	1.47E+01	C	4.41E-01	C	C	7.29E+05	C	C
TPH-Diesel Range Organics3	**COPC**	5.10E+03	N/A	NC	**1.00E+02**	NC	1.60E+04	NC	**1.00E+02**	NC	NC	NA	NA
TPH-Gasoline Range Organics3	NFA	4.72E+00	N/A	NC	1.00E+02	NC	1.60E+04	NC	1.00E+02	NC	NC	NA	NA
TPH-Residual Range Organics3	**COPC**	1.60E+04	N/A	NC	**1.00E+03**	NC	**1.60E+04**	NC	**5.00E+02**	NC	NC	NA	NA
Trans-1,2-Dichloroethene	NFA	4.70E-02	N/A	NC	2.14E+02	NC	2.56E+03	NC	1.52E+02	6.32E+01	NC	2.69E+03	5.77E+02
Trans-1,3-Dichloropropene	NFA	ND	N/A	1.61E+00	4.73E+01	5.80E+01	5.87E+02	6.95E-01	3.38E+01	1.44E+01	7.08E+01	5.92E+02	1.27E+02
Trichloroethylene	**COPC**	8.70E+00	N/A	**6.12E+00**	7.91E+01	2.48E+02	9.36E+02	**2.77E+00**	5.61E+01	2.32E+01	2.64E+02	9.95E+02	2.13E+02
Trichlorofluoromethane	NFA	ND	N/A	NC	1.28E+03	NC	1.57E+04	NC	9.11E+02	3.86E+02	NC	1.60E+04	3.43E+03
Vanadium	NFA	7.89E+01	9.22E+01	NC	1.43E+04	NC	1.86E+04	NC	5.11E+03	5.48E+02	NC	NA	NA
Vinyl Acetate	NFA	ND	N/A	NC	1.40E+03	NC	1.74E+04	NC	9.97E+02	4.25E+02	NC	1.75E+04	3.74E+03
Vinyl Chloride	NFA	ND	N/A	4.25E-01	1.48E+02	9.69E+00	1.53E+03	1.47E-01	1.03E+02	3.87E+01	2.04E+01	1.89E+03	4.06E+02
Zinc	NFA	1.50E+04	**1.26E+02**	NC	6.13E+05	NC	7.98E+05	NC	2.19E+05	2.35E+04	NC	NA	NA

1 Age-adjustment for carcinogenic chemicals takes into account both child and adult soil exposures per USEPA (2000) guidance.
2 BSLs for lead are based on the USEPA's Integrated Exposure Uptake Biokinetic Model and recommendations of USEPA's Technical Review Workgroup.
3 BSLs for TPH from RWQCB, 2001.
Note: BSLs are based on ingestion of soil, dermal contact with soil, and inhalation of dust particles and vapors.

C = Chemical is a carcinogen. No BSL developed for noncancer endpoint.
NA = Not available
N/A = Not applicable
NC = Chemical is a noncarcinogen. No BSL developed for cancer endpoint.
ND = Not detected

Designates an Ambient Concentration exceeded by the Maximum Concentration
Designates a BSL exceeded by the Maximum Concentration
COPCS

For noncarcinogens, a hazard quotient of 1.0 was used as the screening risk level. This represents the ratio of the estimated exposure to a COI exposure level to a reference dose that corresponds to a level of exposure that is unlikely to have an adverse health effect over a lifetime of exposure. Noncarcinogenic COIs with a model output of less than 1.0 were not selected as COPCs.

Similarly, a cancer risk value of 1.0 x 10-6 was used as the screening risk level under which carcinogenic COIs were not selected as COPCs. The risk value is a measure of the probability of an individual developing cancer over a lifetime as a result of exposure to a potential carcinogen above his/her natural or baseline cancer risk (i.e., it represents an excess individual lifetime cancer risk).

For the slab-on-grade scenario, one VOC (TCE) was associated with an incremental risk above 1 x 10-6, and no VOCs were associated with a hazard quotient above 1.0. For the below-grade basement scenario, TCE was the only VOC associated with an incremental risk above 1 x 10-6, and no VOCs were associated with a hazard quotient above 1.0.

It should be noted the risk values presented herein are screening tools, and are not to be considered cleanup targets or levels. Further focused risk assessment and characterization activities, taking into account issues of location, depth, transport, modes or action, and other technical and economic factors, will further refine the risk levels that will be used to guide future site investigations and remediation activities under the program.

Table 7-2. Summary of COPCs

COPC
Antimony
Arsenic
Cadmium
Total Chromium
Copper
Iron
Lead
Manganese
Benzo(a) pyrene
Benzo(b)fluoranthene
Dibenz(a,h)anthracene
TPH-Diesel Range Organics3
TPH-Residual Range Organics3
Trichloroethylene

Table 7-3. Johnson and Ettinger Screening Model Results Summary

Analyte	Maxiumum Soil Gas Concentration (ppmv)	Sample Collection Depth (cm)	Vadose Zone Soil Type	Slab on Grade Scenario		Basement Scenario	
				Incremental Risk From Vapor Intrusion (Carcinogen)	Hazard Quotient From Vapor Intrusion (Non-Carcinogen)	Incremental Risk From Vapor Intrusion (Carcinogen)	Hazard Quotient From Vapor Intrusion (Non-Carcinogen)
1,1-DICHLOROETHENE	0.01	149	Clay	1.5E-08	NA	1.4E-08	NA
1,2,4-TRICHLOROBENZENE	0		N/A	N/A	N/A	N/A	N/A
1,2,4-TRIMETHYLBENZENE	0.0051	207	Silt	NM	NM	NM	NM
1,2-DIBROMOETHANE (ETHYLENE DIBROMIDE)	0		N/A	N/A	N/A	N/A	N/A
1,2-DICHLOROBENZENE	0		N/A	N/A	N/A	N/A	N/A
1,2-DICHLOROETHANE	0		N/A	N/A	N/A	N/A	N/A
1,2-DICHLOROPROPANE	0		N/A	N/A	N/A	N/A	N/A
1,2-DICHLOROTETRAFLUOROETHANE	0		N/A	N/A	N/A	N/A	N/A
1,3,5-TRIMETHYLBENZENE (MESITYLENE)	0		N/A	N/A	N/A	N/A	N/A
1,3-BUTADIENE	0		N/A	N/A	N/A	N/A	N/A
1,3-DICHLOROBENZENE	0		N/A	N/A	N/A	N/A	N/A
1,4-DICHLOROBENZENE	0		N/A	N/A	N/A	N/A	N/A
1,4-DIOXANE (P-DIOXANE)	0		N/A	N/A	N/A	N/A	N/A
2-HEXANONE	0		N/A	N/A	N/A	N/A	N/A
2-METHYLBUTANE	0.01	192	Silt	NM	NM	NM	NM
3-HEPTANONE	0.0034	98	Silt	NM	NM	NM	NM
4-ETHYLTOLUENE	0		N/A	N/A	N/A	N/A	N/A
ACETONE	0.12	207	Silt	NA	3.1E-05	NA	2.7E-05
BENZENE	0.0027	192	Silt	7.1E-10	NA	9.5E-10	NA
BENZYL CHLORIDE	0		N/A	N/A	N/A	N/A	N/A
BROMODICHLOROMETHANE	0		N/A	N/A	N/A	N/A	N/A
BROMOFORM	0		N/A	N/A	N/A	N/A	N/A
BROMOMETHANE	0		N/A	N/A	N/A	N/A	N/A
CARBON DISULFIDE	0.0057	98	Silt	NA	8.8E-07	NA	8.3E-07
CARBON TETRACHLORIDE	0		N/A	N/A	N/A	N/A	N/A
CHLOROBENZENE	0		N/A	N/A	N/A	N/A	N/A
CHLOROETHANE	0		N/A	N/A	N/A	N/A	N/A
CHLOROFORM	0.0015	149	Clay	1.3E-09	NA	1.2E-09	NA
CHLOROMETHANE	0.00073	98	Silty Clay	NM	NM	NM	NM
cis-1,2-DICHLOROETHYLENE	29	177	Clay	NA	5.2E-02	NA	5.3E-02
cis-1,3-DICHLOROPROPENE	0		N/A	N/A	N/A	N/A	N/A
CIS-2-BUTENE	0.013	192	Silt	NM	NM	NM	NM

Table 7-3. Johnson and Ettinger Screening Model Results Summary (continued)

Analyte	Maxiumum Soil Gas Concentration (ppmv)	Sample Collection Depth (cm)	Vadose Zone Soil Type	Slab on Grade Scenario		Basement Scenario	
				Incremental Risk From Vapor Intrusion (Carcinogen)	Hazard Quotient From Vapor Intrusion (Non-Carcinogen)	Incremental Risk From Vapor Intrusion (Carcinogen)	Hazard Quotient From Vapor Intrusion (Non-Carcinogen)
CIS-DECAHYDRONAPHTHALENE	0.86	149	Clay	NM	NM	NM	NM
HEXACHLOROBUTADIENE	0		N/A	N/A	N/A	N/A	N/A
DIBROMOCHLOROMETHANE	0		N/A	N/A	N/A	N/A	N/A
DICHLORODIFLUOROMETHANE	0		N/A	N/A	N/A	N/A	N/A
ETHANOL	0.014	104	Clay	NM	NM	NM	NM
ETHYLBENZENE	0		N/A	N/A	N/A	N/A	N/A
HEXACHLOROBUTADIENE	0		N/A	N/A	N/A	N/A	N/A
ISOPROPANOL	0.014	104	Clay	NM	NM	NM	NM
M,P-XYLENE (SUM OF ISOMERS) [1]	0.0014	192	Silt	NA	2.0E-08	NA	2.9E-08
METHYL ETHYL KETONE (2-BUTANONE)	0.012	85	Clay	NM	NM	NM	NM
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	0		N/A	N/A	N/A	N/A	N/A
METHYLENE CHLORIDE	0.0017	85	Clay	2.4E-11	4.0E-08	1.9E-11	3.2E-08
N-BUTANAL	0.035	207	Silt	NM	NM	NM	NM
n-HEPTANE	0		N/A	N/A	N/A	N/A	N/A
n-HEXANE	0		N/A	N/A	N/A	N/A	N/A
O-XYLENE (1,2-DIMETHYLBENZENE)	0		N/A	N/A	N/A	N/A	N/A
PROPYLENE	0.021	149	Clay	NM	NM	NM	NM
STYRENE	0		N/A	N/A	N/A	N/A	N/A
tert-BUTYL METHYL ETHER	0.0028	104	Clay	NM	NM	NM	NM
TETRACHLOROETHYLENE(PCE)	0		N/A	N/A	N/A	N/A	N/A
TETRAHYDROFURAN	0		N/A	N/A	N/A	N/A	N/A
TOLUENE	0.01	207	Silt	NA	2.2E-06	NA	3.1E-06
trans-1,2-DICHLOROETHENE	12	177	Clay	NA	1.0E-02	NA	1.1E-02
trans-1,3-DICHLOROPROPENE	0		N/A	N/A	N/A	N/A	N/A
TRICHLOROETHYLENE (TCE)	140	177	Clay	6.7E-08	NA	8.9E-08	NA
TRICHLOROFLUOROMETHANE	0		N/A	N/A	N/A	N/A	N/A
VINYL ACETATE	0		N/A	N/A	N/A	N/A	N/A
VINYL CHLORIDE	0.034	149	Clay	3.0E-09	1.6E-05	2.7E-09	1.4E-05

1. Model run using p-xylene values to represent more conservative scenario.
N/A = Not applicable
NM = Not Modeled (no data for analyte available in model)

8.0 DATA QUALITY OBJECTIVES

A list of site-wide DQOs was presented in Section 2.0. The DQOs were developed as planning tools to guide the investigation and optimize sampling strategies. These site-wide DQOs were associated with feature specific areas of concern (e.g., parkerizing room, firing ranges, USTs) for this report. These feature-specific DQOs are presented in this section or Table 8-1 and are assessed as to whether the DQO was or was not adequately met.

Table 8-1. Data Quality Objectives

Data Quality Objective	DQO Met?	Explanation
PARKERIZING TANKS		
Building 56 and 57(A)		
1. Assess if SVOCs, VOCs, fuels, acids/alkalis, or metals are present in soil and groundwater from former parkerizing operations.	Yes	PAHs (phenanthrene, pyrene), VOCs (TCE, acetone, chloroform and cis-1,2-DCE) and metals (iron, copper, arsenic, manganese) were detected in soil. Fuels were detected at low concentrations in groundwater from borings B056SB002 and B056SB003 (TPHG at 51µg/L and TPHD at 1.3 µg/L). VOCs detected at elevated include: TCE, cis-1,2-DCE, trans-1,2-DCE, 1,2-DCA, and 1,1,2-TCA. Chloroform was also detected. The maximum concentration of 2,200 µg/L TCE was in B056SB003. Fluorene was detected in groundwater.
2. Determine if additional data collection, risk analysis, or remediation is needed.	Yes	PAHs and metals do not exceed BSLs and ambient concentrations. Therefore, no further characterization of these analytes are recommended. Additional groundwater and soil sampling is recommended to further define the vertical and lateral extent of VOCs in groundwater and soil.
BOILER ROOMS AND THE BREEZEWAY		
1. Assess if fuels, oils, or lead are present in soil removed from Building 65(B).	Yes	Elevated concentrations of lead, VOCs, motor oil, and diesel fuel were detected in soil samples from Building 65(B). Lead was detected at a maximum concentration of 55 mg/kg in shallow soil at boring B065BHA003. Maximum detected concentrations of motor oil and diesel fuel are 970 mg/kg and 120 mg/kg, respectively, at 1.5 feet bgs in boring B065BHA003.
2. Assess if fuels, oils, or lead are present in soil beneath former Building 58 and 65(A).	Yes	Diesel fuel, motor oil, gasoline, and lead were detected. Gasoline concentrations are detected at low concentrations. The highest concentrations of motor oil (11,000 mg/kg), diesel fuel (4,700 mg/kg), and lead (8.68 mg/kg) were reported in boring B056AHA001 at 4.5 feet bgs. PAHs were detected in soil.

Table 8-1. Data Quality Objectives (continued)

Data Quality Objective	DQO Met?	Explanation
DEGREASER AND OIL/WATER SEPARATOR		
1. Assess if solvents, acids, or preservatives are present in soil and groundwater beneath the former degreaser	Partial	Drilling terminated at 27 feet bgs without encountering groundwater. There was no visual evidence of staining, discoloration, or elevated PID readings that would indicate an impact to soil or groundwater.
2. Assess if fuels or solvents are present in soil beneath the former oil/water separator.	Yes	VOCs and fuels were detected in samples collected from boring B057AHP001. No groundwater was encountered.
FIRING RANGES AND SMALL ARMS STORAGE AND REPAIR		
Basement of Building 57		
1. Assess firing range soil for presence of firing range metals and powder residue.	Yes	Very high concentrations of arsenic, antimony, cadmium, copper and lead were found in the gunite target material collected from each firing range.
2. Assess if VOCs, preservatives, and acids from Buildings 57 are present in basement soil.	Yes	VOCs (TCE, benzene, methylene chloride, and cis-1,2-DCE) were detected in soil samples. The highest TCE concentration reported was 8.7 mg/kg in surface soil.
3. Determine if additional data collection, risk analysis, or remediation is needed.	Yes	Removal and off-site disposal of firing range target material from the basement of Building 57 should be performed.
Building 65(B)		
1. Assess if fuels, oils, firing range metals, or residual powders are present in Building 65B soil.	Yes	Elevated concentrations of lead were detected in soil samples from boring B065BHA002. Lead was detected at a concentration of 481 mg/kg. Motor oil and diesel fuel were detected at concentrations of 16 and 84 mg/kg, respectively.
2. Assess if metals are present in soil.	Yes	Elevated concentrations of lead were detected in soil.

Table 8-1. Data Quality Objectives (continued)

Data Quality Objective	DQO Met?	Explanation
CISTERNS		
1. Determine if underground cisterns exist outside the complex.	Yes	The geophysical survey did not identify any of the suspected cisterns believed to be located around the perimeter.
FOUNDRY		
1. Assess if metals and foundry waste are present in soil beneath the former foundry facilities.	Yes	Elevated concentrations of metals (arsenic, chromium [total], copper, and lead) were detected in soil.
FORGES AND HYDRAULIC PRESS		
Building 55		
1. Assess if fuels, metals, and hydraulic oil are present in soil beneath the former forges and hydraulic press.	Yes	There is no evidence of a surface release of fuels from two suspected forges and a former hydraulic press. There is evidence of a surface release of metals to soil, in particular lead, in the area of the two suspected forges. A low concentration of TCE (2.1 mg/kg) was detected in one soil sample at 1 foot bgs.
2. Determine if additional data collection, risk analysis, or remediation are needed.	Yes	Metals were detected at high concentrations in soil in the area of the suspected forges. The lateral extent of the contamination in soil in the area of the suspected forges has not been defined; therefore, additional characterization is recommended.
USTS AND ASTS		
Building 53 USTs beneath Building 56(A)		
1. Determine if the USTs and associated piping exist beneath the southeast corner of Building 56A, and if they require removal or closure.	Yes	Geophysical evidence was inconclusive due to the elevated concrete floor. Analytical data does not indicate the presence of diesel or lighter-end petroleum hydrocarbons in soil or water. Because the identification of these USTs was from a proposed drawing and their presence was not confirmed from records research or from the geophysical survey, the USTs were likely never installed. Fueling pipelines were identified by geophysics from the southeast corner of Building 56(A) connecting to Building 154 USTs. It is unknown what the pipelines connected to.

Table 8-1. Data Quality Objectives (continued)

Data Quality Objective	DQO Met?	Explanation
2. If USTs and related pipelines exist, assess if fuels, oils, or lead are present in soil and/or groundwater beneath the USTs.	Yes	Based on the soil and groundwater petroleum hydrocarbon data in the surrounding area of B053SB001, motor oil appears localized in soil and may extend beneath the southeast corner of Building 56A. Motor oil has not impacted the groundwater at levels above detection limits. PAHs were detected in soil and groundwater southeast of Building 56A.
3. Determine if additional data collection, risk analysis, or remediation are needed.	Yes	Additional investigation is recommended to determine the extent of TPH and PAH contamination.
Building 65(A)		
1. Assess if fuels are present in soil and/or groundwater beneath the USTs.	Yes	Fuels were detected at elevated concentrations in soil. The maximum concentration of motor oil is 11,000 mg/kg at 4.5 feet bgs. Elevated concentrations of fuel were detected in groundwater samples collected at trench locations when the USTs were removed.
2. Determine if additional data collection, risk analysis, or remediation is needed.	Yes	Additional investigation is needed to determine the vertical and horizontal extent of contamination.
Building 65(B)		
1. Determine if the USTs and associated piping exist below Building 65(B).	Partial	Geophysical results identified parabolic features characteristic of USTs.
2. If USTs and related pipelines exist, assess if fuels, oils, or lead are present in soil and/or groundwater beneath the USTs.	Partial	Soil has been impacted with diesel fuel and motor oil. The maximum concentration of diesel fuel reported is 120 mg/kg and motor oil is 970 mg/kg. Groundwater was not encountered to the maximum depth hand augered (~11 feet bgs).
3. Determine if concentrations are reported above assessment criteria, which may require additional data collection, risk analysis, or remediation.	Yes	An additional investigation or a risk analysis is recommended to define the extent or risk of TPH contamination.

Table 8-1. Data Quality Objectives (continued)

Data Quality Objective	DQO Met?	Explanation
Building 120		
1. Determine if the underground storage tanks (USTs) and associated piping exist near Building 120, and if they require removal or closure.	Partial	Geophysical evidence of the UST was inconclusive due to the elevated concrete floor.
2. If USTs and related pipelines exist, assess if fuels, oils, or lead are present in soil and/or groundwater beneath the USTs.	Partial	Diesel and motor oil were identified in water at elevated levels, which indicates a release has occurred. It is unknown if the USTs remain or have been removed. VOCs in water are likely associated with a larger VOC release that has migrated to this area.
3. Determine if additional data collection, risk analysis, or remediation is needed.	Yes	The extent of diesel and motor oil in water has not been fully defined in the area of Building 120. An additional investigation is recommended to define TPH contamination.
UTILITY TUNNEL		
Beneath Building 55		
1. Assess if fuels, oils, metals are present in the utility tunnel beneath Building 55.	Yes	Lead, motor oil, and diesel fuel was detected in surface soil in boring B055HA001 at concentrations of 1,360 mg/kg, 16,000 mg/kg, and 1,900 mg/kg, respectively. PAHs were also detected in soil. Groundwater was not sampled.
2. Determine if additional data collection, risk analysis, or remediation is needed.	Yes	A risk analysis is recommended to define the risk of lead, PAHs, and TPH contamination.
Beneath Buildings 56, 57, and 57(A)		
1. Assess if fuels, oils, metals are present in the utility tunnel beneath Buildings 56, 57, and 57(A).	Yes	Lead concentrations are elevated in borings B056HA001 and B056HA002. The maximum is 6,360 mg/kg at 0.5 feet bgs. Surface soil also is impacted with diesel fuel and motor oil. The surface soil contamination may be from overlying wooden floor and permeated to the utility tunnel.
2. Determine if additional data collection, risk analysis, or remediation is needed.	Yes	A risk analysis is recommended to define the risk of lead, PAHs, and TPH contamination.

Table 8-1. Data Quality Objectives (continued)

Data Quality Objective	DQO Met?	Explanation
TRANSFORMER ROOM		
1. Assess if PCBs are present in transformer room soil.	Yes	No PCBs were detected in soil samples collected in the Transformer Room. There is no evidence of a release into soil from former transformers in the Transformer Room.
2. Determine if additional data collection, risk analysis, or remediation is needed.	Yes	No additional investigation is recommended for the Transformer Room.
PAINT SHED/SMOKE STACK/INCINERATOR		
1. Visually assess soil near the smoke stack/incinerator for evidence of burning or burning by-products and determine if additional data collection is warranted.	Yes	No visual evidence of burning or burning by-products were found in soil during the subsurface investigation. The concrete foundation of the former smoke stack/incinerator remains. No additional data needed.
2. Assess if oils, metals, or explosives by-products are present in soil near the former smoke stack/incinerator.	Yes	Analytical data for petroleum hydrocarbons, metals and explosives indicate no impact to surface or subsurface soil.
3. Determine if additional data collection, risk analysis, or remediation is needed.	Yes	Diesel fuel was detected at minor concentrations (6.3 mg/kg). Therefore, no further action is recommended for the smoke stack/incinerator and the former Building 66(A).
TOOL HOUSE		
Building 59(A)		
1. Assess if oils are present in soil beneath the former building.	Yes	Motor oil, and PAHs were detected in soil. In groundwater, motor oil was detected at a concentration less than the MDLs. Based on the soil and groundwater petroleum hydrocarbon data in the surrounding area, motor oil is localized in soil beneath former Building 59(A) and may extend beneath the southeast corner of Building 56A.
2. Determine if additional data collection, risk analysis, or remediation are needed.	Yes	Additional investigation is recommended to determine the extent of fuel and PAH contamination.

Table 8-1. Data Quality Objectives (continued)

Data Quality Objective	DQO Met?	Explanation
EQUIPMENT ROOM		
1. Assess if fuels, oils, metals are present in equipment room soil.	Yes	Diesel and motor oil was detected in soil from samples collected near a drain adjacent to a former AST (boring B056AHA004).
2. Determine if additional data collection, risk analysis, or remediation is needed.	Yes	An additional investigation or a risk analysis is recommended to define the extent or risk of TPH contamination.

9.0 CONCLUSIONS AND RECOMMENDATIONS

The following section summarizes the results of the investigation at the 50 Series Complex.

9.1 Summary of Conclusions

- Geology beneath the 50 Series Complex consists of artificial fill, alluvial/fluvial material, and Bay Mud overlying the Vine Hill Sandstone (bedrock). The 50 Series Complex is centered on a localized bedrock high. Bedrock consists of steep southwesterly dipping beds of sandstone, siltstone, and shale.

- Fill, alluvium, and Bay Mud range from 0 feet to over 25 feet thick. Bay Mud is predominately located to the south of the 50 Series Complex coinciding with the location of historical marshlands.

- Groundwater beneath the Complex occurs in the alluvial and Bay Mud materials above the bedrock. Groundwater elevations around the 50 Series Complex range from approximately 6 feet to 14 feet above msl. The wide variation in elevations is in part controlled by the depth to bedrock.

- Groundwater quality measurements (TDS, pH) beneath the 50 Series Complex are primarily indicative of freshwater which is likely recharged from rain and stormwater runoff. Groundwater south of the Complex is brackish, indicating influence from the former marshland or the Carquinez Strait.

- Preliminary ambient metals concentrations in soils at the 50 Series Complex were calculated for use in the human health risk screening. Ambient concentration limits were calculated as the 95th percentile of data sets.

- A data quality assessment was completed in accordance with the QAPP.

- Geophysics confirmed the existence of a fuel distribution system of piping from Building 53 to Building 154, as well as the U-shaped vat in Building 57A.

- Degreasers and parkerizing vats are probable sources of solvents and its degradation products (TCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride). Chlorinated solvents are widespread in groundwater beneath the 50 Series Complex and extend southwest and northeast beyond the 50 Series Complex. Solvents were also detected in soil and soil gas beneath the 50 Series Complex. In addition, methylene chloride was detected in soil, soil gas, and groundwater and appears to have been used at the site in pure form. The distribution of chlorinated solvents appears to be controlled by the topography of the bedrock.

The detection of solvents at the 50 Series is consistent with the CSM described in Section 2.0 and Table 1-1. Chemicals used for processing small arms by parkerizing included solvents such as TCE. These chemicals were primarily introduced to soil and then groundwater from leaking vats and dumping into the nearby former marshland. A secondary pathway included these chemicals spilled on the wooden floors from the shops above the utility tunnel and leaked through to the dirt floor into the tunnel and to groundwater.

- USTs and ASTs were used to store diesel fuel, gasoline, and fuel oil at the Arsenal. These fuels were detected as frequently as VOCs in soil and groundwater. Diesel fuel and oil were most frequently detected beneath the 50 Series Complex, and were generally detected at the same locations.

- The highest detections of TPH as diesel fuel and motor oil, most likely stored in USTs and ASTs, were reported beneath Building 56A, and near the known USTs located southwest and southeast of the 50 Series Complex at Building 53 and Building 154. Consistent with the CSM, these USTS corroded and developed cracks, allowing diesel fuel, gasoline and/or fuel oil to leak into the subsurface soil or directly into groundwater.

- Also stored in USTs/ASTs was TPH as gasoline. TPH as gasoline in soil and groundwater was reported much less frequently than other hydrocarbon ranges. The highest gasoline concentrations were also reported near the USTs at Building 154 and Building 53 and an unknown source north of the 50 Series Complex near Building 56. The gasoline reported near the USTs at Buildings 154 and 53 is consistent with the CSM, however, the gasoline north of the complex was not expected.

- There appears to be multiple source areas that have impacted groundwater with solvents from the former dipping tanks and degreasers and fuel from the former USTs/ASTs. The dipping tanks, degreasers and USTs/ASTs were suggested in the CSM as possible source areas. The vats in Building 57A and Building 56 may have contributed solvents to the groundwater. The contents of the dipping tanks containing solvents were probably dumped into the former marshland area impacting shallow groundwater. These same solvents were occasionally spilled on the wooden floors from the dipping tanks and migrated downward into the groundwater.

  Releases from the former USTs at Buildings 53, 103, and 154 appear to have impacted groundwater with fuels. When two tanks were removed near Building 154, in March 2002, they were found to have numerous holes indicating that petroleum products stored in those tanks (diesel fuel, leaded gasoline, or fuel oil) may have leaked into the groundwater as was suggested in the CSM.

- MTBE was detected in groundwater samples from Building 57A and near Building 53 at concentrations ranging up to 17 µg/L. MTBE was first used as a fuel additive in the 1970s, after Arsenal closure. The discovery of MTBE in groundwater at the complex demonstrates that businesses occupying the 50 Series Buildings used the USTs/ASTs for storage of fuels after the Army departed.

- Concentrations of lead, copper, and antimony were detected above ambient concentrations in the Building 57 firing range target material and the soil adjacent to the Parkerizing vat in Building 56. Lead was also found in soil in the area of former Building 58 and Building 65(B) suggesting a potential release from the former small arms shop/boiler house, the firing range, and the former machine gun test firing range. The elevated metal concentrations at these source areas are consistent with the CSM.

- The potential risk posed by VOCs intruding into indoor air spaces was evaluated by input of maximum soil gas concentrations into the Johnson and Ettinger model. Results of this evaluation indicate that TCE was the only VOC tested with an incremental cancer risk above 1 x 10^{-6} for the slab on grade and basement scenarios. No VOCs tested were associated with a hazard quotient above 1.0.

A summary of findings associated to possible source areas is provided below.

- The presence of USTs associated with Buildings 58, 65(A), 65(B), and 120 could not be confirmed by geophysical methods. The presence of reinforced concrete and elevated floors in the building caused some anomalous results. These USTs were likely removed before the construction of Building 56A and 120. The geophysical survey did not identify any cisterns believed to be located around the perimeter of the 50 Series Complex. Soil and groundwater samples were collected near the former boiler buildings, and indicate the presence of diesel and motor oil, probably stored in USTs for the boilers. Soil from the former boiler house at Building 65(B) that was spread out in the breezeway is impacted with TPH at levels below the BSLs.

- There is no evidence of impact to soil from the degreaser or the oil/water separator.

- Analytical results from soil samples collected beneath Building 55 indicated releases to the subsurface of lead, solvents, and fuels. The source of the solvents (in the form of TCE) and fuels (in the form of PAHs) in soil is not known. These detections were not expected based on usage and are not consistent with the CSM. Groundwater south of Building 55 is impacted with fuels and solvents. The source of fuels in groundwater may be related to the fuels reported in groundwater north of the 50 Series Complex. The solvents reported in groundwater in this area appear to be related to the solvents associated with the parkerizing locations.

- Although fuels are widespread in shallow soil in the utility tunnel, there is no evidence that the utility tunnel is a source area. Contamination in the utility tunnel appears to be related to industrial activities conducted throughout the 50 Series Complex.

- There is no evidence of impact to soil from explosives or metals from the former smoke stack/incinerator or metals and oils from the former paint shed/shop at Building 66(A).

- There appears to be no release of PCBs, hydrocarbons, or metals from former equipment in the transformer room.

- Detections of TPH and PAHs in soil near former Building 59(A) may indicate a release from oil stored in the former tool house.

- Fourteen COIs were identified as COPCs. These COPCs are listed in Table 9-1.

Table 9-1. Summary of COPCs in Soil at the 50 Series Complex

Inorganic Analytes	Organic Analytes
Antimony	Benzo(a)pyrene
Arsenic	Benzo(b)flouranthene
Cadmium	Dibenz(a,h)anthracene
Chromium, total	Trichloroethyene
Copper	Diesel Fuel
Iron	Motor Oil
Lead	
Manganese	

9.2 Recommendations – Additional Investigation Activities

Based on the findings for the 50 Series Complex site investigation, several suspected sources appear to have impacted soil, soil gas, and groundwater beneath the 50 Series Complex buildings. Twenty-four chemicals including VOCs and metals, have been reported at concentrations that exceed ambient concentrations in soil and/or BSLs; several of these chemicals appear to be relatively widespread in their distribution. FA/BC recommends that a Remedial Investigation proceed at the 50 Series Complex to define the vertical and lateral extent of impacts in soil, soil gas and groundwater. Some detailed recommendations for remediation and investigation activities are described below.

- Conduct a geologic investigation to determine the surface topography of the bedrock and the relationship of the bedrock topography on chemical distribution in soil and groundwater.

- Conduct additional soil and groundwater sampling to assess the vertical and lateral extent of VOCs and TPH southeast of the 50 Series Complex.

- Conduct groundwater sampling and additional soil sampling to assess the lateral and vertical extent of metals, TPH, and PAHs in the area of the former forges at Building 55.

- Conduct additional soil and groundwater sampling to assess the vertical and lateral extent of VOCs and TPH in soil and groundwater in the area of Building 56 and north of the 50 Series Complex.

- Conduct removal and off-site disposal of the left-over materials from the former sandblasting operations located in the Building 56 basement.

- Conduct additional investigation to determine the lateral and vertical extent of petroleum hydrocarbons in soil at the equipment room in Building 56A.

- Conduct an additional soil investigation or site-specific risk analysis for the soil removed from the former foundry at Building 56(B).

- Conduct removal and offsite disposal of firing range target material from the basement of Building 57.

- Conduct patching of exposed soil at B057HA004 in the basement of Building 57 to eliminate potential exposure to constituents in shallow groundwater. Some soil excavation may be necessary.

- Conduct further soil, soil gas, and groundwater assessment at Building 57A to determine vertical distribution of VOCs in soil and vertical and lateral extent of VOCs in groundwater related to Building 57A vat.

- Conduct an additional soil and groundwater investigation to determine the lateral and vertical extent of TPH and PAHs for the suspected USTs beneath the southeast corner of Building 56A and the tool house at former Building 59(A).

- Conduct a groundwater investigation and additional soil assessment to determine the lateral and vertical extent of TPH, lead, and PAHs at former Building 65(A) and former Building 58.

- Conduct additional soil and groundwater sampling in the vicinity of reported detections of diesel and motor oil near Building 120.

- Conduct additional perimeter groundwater sampling to determine vertical and lateral extent of VOCs and hydrocarbons.

- Conduct an additional soil investigation or site-specific risk analysis to determine the extent or risk of lead at the former machine gun test firing range at Building 65(B).

- Conduct an additional soil investigation or site-specific risk analysis for the soil removed from the former boiler house and the suspected USTs at Building 65(B).

- Conduct a risk analysis for lead, PAHs, and TPH in soil in the utility tunnel.

9.3 Recommendations – No Further Action

The scope of the site investigation was based in large part on historical records and site surveys that identified a number of potential problem chemicals at the 50 Series Complex. Although significant additional investigation is warranted at the 50 Series Complex, the results of the site investigation indicate that a number of potential sources identified in the historical record have not resulted in contamination, and do not warrant additional investigation. These site and features are described below.

- No further action under FUDS is recommended to address the Building 56A transformer room.

- No further action under FUDS recommended at the former Building 66(A) and the smoke stack/incinerator.

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